MEDICAL REPOSITORY.

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ARTICLE I.

A SKETCH *of the* HISTORY *of the* DISEASES *of the* STATE *of* DELAWARE: *Communicated in a Letter from Dr.* JOHN VAUGHAN, *of Wilmington, to Dr.* MILLER.

No. I.

Dear Sir,

IN compliance with my promiſe, together with a deſire of contributing to the valuable ſtock of information ſo faſt accumulating, and ſo judiciouſly recording in the Medical Repoſitory, I herewith tranſmit you No. I. of *a hiſtory of the diſeaſes of Delaware.* From the ſmall extent of territory, and the uniformity of ſoil and climate of this State, I preſume that a geographical medical hiſtory is not only unneceſſary, but unimportant; except an upper point of the State, between Chriſtiana and Naaman's Creeks, including the town of Wilmington, and a diſtrict of territory, of from 60 to 80 ſquare miles, which partakes of the ſoil and ſalubrity of Pennſylvania. My late reſidence being contiguous to that fenny tract of country ſo long known by the name of the Welch-Tract Swamps, furniſhed me with a favourable opportunity of obſerving thoſe forms of fever for which our State has become proverbial. And having kept a minute meteorological diary, I ſhall conclude with ſome general obſervations on the morbid influence of the ſenſible qualities of the atmoſphere on the ſub-oxygenated ſyſtems of the inhabitants of ſwamps.

As our ſpring diſeaſes are influenced by the fevers of the preceding autumn, it will, perhaps, be moſt ſatisfactory and methodical to commence with the diſeaſes of ſummer, and end with thoſe of ſpring.

The months of May and June may be denominated our interregnum, or, *e converſo*, the limited reign of the tranſient Hygeia, as the reſt of the year ſhe is either buried in the marſhes or obſcured by the fogs.

July generally aſſumes a different aſpect; and, towards the middle, becomes of a greyiſh complexion. Eruptive and inteſtinal diſeaſes uſually occur, with ſporadic caſes of fever.

Eruptive diſeaſes are generally critical and ſalutary. Thoſe children who are affected with cutaneous eruptions, as the nettle raſh, or prickly heat, are otherwiſe free from complaint; while others have diarrhœas and choleras, or intermitting fevers. A ſtrict attention to this circumſtance, and a full conviction of the alternation of eruptive and inteſtinal diſeaſes, impreſſes me with ſome reſpect for the old humoral pathologiſts, whoſe works are, perhaps, unjuſtly buried with them; and of Dr. Ruſh's diviſion of the different ſtates of fever. I have frequently ſeen them alternately in the ſame perſon; and the eruptive ſtate, when ſecondary, affords a certain prognoſis of relief. But if the eruption be ſuddenly checked by cold, particularly if accompanied with moiſture, it reverts to an inteſtinal ſtate of fever, obſtinate in the extreme.

The inteſtinal ſtate of fever, whether under the form of cholera, diarrhœa, or dyſentery, is much more tedious, and difficult of cure, than our ordinary intermittents. Choleras are not very frequent; and are generally relieved—nay, always cured—by the acknowledged ſpecific, calomel, unleſs neglected in the commencement. It is occaſionally ſerviceable to interpoſe alkaline remedies, if there be a ſuper-acidity of the ſtomach: and embrocations alſo have their effect in tranſlating the morbid action to the ſkin.

Diarrhœa is the moſt common form of this ſtate of fever, and often the moſt diſtreſſing. It is uſually neglected until it becomes mucaginous, and attended with teneſmus, aſſuming the form of dyſentery; or purely ſerous, and profuſe in the extreme. In the former caſe I uſually evacuated with *ol. ricini*, and then gave calomel in ſmall but frequent doſes; a neutral draught, compoſed of *ſal. tartari. crem. tart.* ana ʒj. *aq. bul.* ℔j. half a gill every hour; common drink, barley-water with raiſins, and a full opiate, *hora ſomni*. In the latter, or ſerous form, I uſually gave the ſalt of tartar in the form of julep, with laudanum, mint, &c. and frequently alternated with a decoction of columba and ſnake-root. In ſome caſes, Huxham's tincture, with allum, was very effectual. But,

in all degenerate ſtates of inteſtinal fever, I found a vitriolated tincture of iron (as hereafter mentioned under the head of intermittent fever), with laudanum p. r. n. the moſt effectual remedy I ever employed; particularly if it were a complicated ſtate of fever, and the debility conſiderable.

The dyſentery was never epidemic during my reſidence in the marſhy country, though annually ſporadic. The treatment varied but little from the previous, or bilious form of diarrhœa, except in the more frequent uſe of evacuants in the commencement; and an aſſiduous exhibition of alkalies and calomel, with a pill of opium and calomel at bed time, in ſufficient quantity to procure an armiſtice from pain.

But while we were labouring under remittent and intermittent fevers, our neighbours, on an adjacent ridge of hills that runs eaſt and ſouth-weſt, and divides the Pennſylvania highlands from the fens of Delaware, were infected with the dyſentery in a very mortal degree: yet the latter was confined within a parallel line of from ſix to ten miles, and was, no doubt, produced by the *marſh miaſma* becoming concentrated or condenſed in its paſſage through a colder ſtratum of air, and enabled to act more immediately on the ſtomach and inteſtines. And in Wilmington, the exhalations from an extenſive marſh, which lies on the ſouth-weſt ſide of the town, aſcend over the level of the town without much miſchief, and alight on the ſummit of the hill; producing agues and intermitting fevers, when perſons living within a few rods, and on a level with the marſh, are unaffected. Our autumnal winds are generally favourable to this transfer; as is alſo the caſe reſpecting the Welch-Tract marſhes, and adjacent hills aforementioned. The winds, at this ſeaſon, are commonly ſouthward of weſt, and, of courſe, waft the *miaſma*, in a direct current, to the ridge of hills.

Auguſt and September may, with propriety, be denominated our fever months. Auguſt, from its intenſe uniform heat and general inſalubrity, has received the appellation of the *long* month among the vulgar; but September is equally unhealthy. There is only this difference—that remittents are more frequent in the latter than in the former, and *vice verſa:* therefore intermittent fevers are the firſt in courſe.

Contrary to the obſervations of the indefatigable Jackſon, the quotidian form is much the moſt frequent. Its period of invation is generally between eight and eleven o'clock A. M. —rarely about noon: the chill is ſlight, but the fever violent;

always in inverſe proportions. This is the caſe in every form of intermittent; the cold and hot ſtages are directly oppoſite to each other in duration and violence.

The ſemi-tertian invades at eight or ten o'clock on the firſt day, with a chill, and recurs the next day, at two or three o'clock P. M. without a chill—fever alternately moderate and violent.

Tertians invade at two or three o'clock P. M.—chill greater than in quotidians, and *vice verſa*.

Quartans commence at five or ſix o'clock P. M.—chill greater and fever leſs than any other form.

Relapſes were, in general, milder than firſt attacks, unleſs the ſubjects were much debilitated. But degenerations critical. Quotidians often degenerate into tertians and ſemi-tertians; and the latter not unfrequently into continued fever. If the degenerated types poſtponed the acceſſion, or period of recurrence, it was always favourable, and the diſeaſe was ſhortened in duration. But if they anticipated, they became proportionably violent and tedious. The duration of intermittents may commonly be prognoſticated by the ſtate of the ſtomach and periodical type. The diſorder of the ſtomach is proportioned to the duration of the chill; and a vomiting generally occurs at the termination of the horror, or ſhivering, or commencement of the hot ſtage. And the collateral ſpecies of type, indicating danger or difficulty, is that in which there is leaſt releaſe from fever—which is uſually the ſemi-tertian.

Modus Medendi.

In the cure of intermittent fevers we may form three general indications.

1ſt. To prevent the recurrence of the cold ſtage.

2dly. To moderate the cold and hot ſtages when formed; and,

3dly. To change the ſtate of the ſyſtem, by exciting a counter-morbid action; or to reſtore its tone, and enable it to withſtand the action of the remote cauſe.

The firſt may be accompliſhed by increaſing the action of the vaſcular ſyſtem with diffuſible ſtimuli, external heat, or exerciſe. The moſt effectual mode of uſing the former is to lie in bed, covered warm, and about twenty minutes before the period of acceſſion, to take the following draught: ℞ *Spt. lavend. c. Tinct. opii. camphorat.* ana ʒ j. *ſpt. c. cervi gtt.* xl. *Ol. menthæ. pip. gtt.* i. *M. f. hauſtus.* A ſpirituous vehicle is

the moſt proper. Or, ℞ *Tinct. thebaic. gtt.* lx. *ſal. am. vol.* ℥j. *m. ſumend. ut ſupra.* The ſal. ammoniac leſſens the ſoporific powers of opium ſo much, that this potion may be taken with as much ſafety as twenty drops of laudanum *per ſe.* Or emetics, given ſo as to excite vomiting a little before, and to continue the operation after the acceſſion, not unfrequently produce a ſolution of the paroxyſm, by exciting a different morbid action. Thus active cathartics, given in the hot ſtage, are alſo often effectual in diverting the morbid action to the inteſtines—producing a counter-diſarrangement of the diſarranged action, and not merely by depletion; otherwiſe bleeding would anſwer the ſame purpoſe—which is not the fact. The ſtate of mind alſo merits a correſpondent degree of regard in the prevention and cure of intermittents. Every man that admits a phyſical neceſſity, and reciprocal dependence, ſubſiſting between the mind and body, muſt admit the plauſibility of the poſition; and he that practices it judiciouſly will not find himſelf diſappointed in the experiment, by oppoſing the ſtate of mind, previous to the recurrence of the paroxyſm, with a different impreſſion. For example: I once cured an old hyſterical woman, who was deſpondent, and prejudiced againſt medicine, by perſuading her into a chaiſe before the period of acceſſion; and, inſtead of returning her home in time to have the ague, I drove, *helter ſkelter*, over a rough piece of road; and, in her apprehenſions of being upſet, ſhe forgot the ague, and remained free from it. Perhaps the exerciſe of body might have contributed to the cure. But I knew a child that had laboured under an ague for many weeks, who was cured by falling into a creek at the commencement of the chill. He was much terrified, and the alarm diſpelled the chill. He remained well. I alſo was cured of an intermittent in a ſimilar manner, by a mental impreſſion. Juſt as the paroxyſm of an ague was recurring, I was called to a lady in parturition, and with doleful apprehenſions of my own ſufferings from the circumſtances under which I expected to ſpend the night. But my own feelings were diſplaced by an intereſt in her welfare; and I forgot my ague, and it forgot me afterwards.

2dly. When the paroxyſm is formed, we ſhould endeavour to moderate its violence. The horripilatio is moſt effectually relieved by re-promoting the circulation in the extreme veſſels, by the application of heat in a humid form, and wrapping the patient warm in bed. Immerſion is generally inconvenient: we may, therefore, ſubſtitute pediluvia fomentations to the

thorax, or, moſt effectually accompliſh the purpoſe by enveloping the patient in a blanket wrung out of hot water; and, if neceſſary, from twenty to ſixty drops of the ſpt. c. cervi, with twenty drops of laudanum, may be given in ſome warm vehicle. And if the chill can be interrupted by theſe means, the conſequent fever is principally artificial, and of ſhort duration, and has a powerful tendency to change the nature of the diſeaſe.

The febrile ſtage is announced by a vomiting, which is proportioned to the previous chill; and, if conſiderable, ſhould be encouraged by large draughts of warm water, weak chamomile tea, or a few grains of ipecacuanha, if bile is ejected. But if the ſtomach is not much diſordered, and there is no other local affection, a grain of opium, given about half an hour after the commencement of fever, has the moſt happy effect in promoting ſweat, relieving thirſt, and all the urgent ſymptoms. If there be any pain of the head, and the arterial action comparatively violent, it may be combined with tartar-emetic, ſo as to produce a ſlight nauſea, without vomiting. Having concluded a paroxyſm, we ſhould,

3dly. Endeavour to reſtore the tone of the ſyſtem, and enable it to withſtand the recurrent action of the exciting cauſe, or to excite an artificial action, as before-mentioned: and ſcrupulouſly avoid every debilitating power, every circumſtance tending to produce chilline[illegible], and as ſtrenuouſly inculcate the uſe of moderate exerciſe in a dry air—warm clothing, a generous diet, the moderate uſe of bitters, and a removal to a higher country, if convenient.

Though fearful of having extended this number already beyond its proper limits, I wiſh to annex ſome general obſervations on the method of cure, and on ſome incidental ſymptoms: and, without repeating the encomiums beſtowed on the Peruvian bark, I ſhall recommend a ſubſtitute, much more eaſy and expeditious, and equally ſafe. To effectuate more completely the objects of our ſeveral indications, the moſt powerful remedies ſhould be reſorted to; and it may be admitted as an eſtabliſhed law of nature, that there is an antidote for every diſeaſe, though few of them are as yet diſcovered. I am aware that this poſition will be denominated dogmatical: but *experientia docet* is my creed, and experience warrants me in recommending *arſenic* as a ſpecific in the cure of intermittent fevers. It, however, is deemed unphiloſophical to acknowledge the title of ſpecific properties in medicine; and,

equally ſo, to uſe articles whoſe mode of operation you cannot explain by ſome known law of the animal economy. Yet, if every fact be rejected becauſe it is inexplicable, and nothing believed but what is ſelf-evident, our ſtock of knowledge will be but ſmall indeed.

The ſolutio mineralis arſenici of Dr. Fowler being in too uncertain a form for indiſcriminate uſe, I adopted a form of pill, compoſed of half a grain of opium and one third of a grain of arſenic, twice a-day. But finding it produce vertigo, nauſea, and an itching in the ſkin, in a few caſes; and as alkalies reſtrain the effects of mineral poiſons, I changed it for the following formula: ℞ *Ammoniæ muriatæ* ʒ j. *pulv. arſen. alb. gr.* x. *pulv. opii. gr.* xv. *ſyr. com. q. ſufficit, M. f. maſſa, in pilulas æquales* lx. *dividenda; quarum ſumat* ij. *mane et veſpere.* It is, perhaps, unneceſſary to add, that great caution is requiſite in forming the maſs. The beſt mode is to triturate the opium and ammonia together, until perfectly pulverized; then form the maſs with ſyrup, and ſprinkle on the arſenic by degrees.

I always gave them, morning and evening, without regard to the fever, and with the moſt invariable ſucceſs, in all caſes (excepting pregnancy), and to all ages, in proportioned doſes, without the leaſt bad effect. To perſons under puberty, one pill, morning and evening, is a ſufficient doſe: and for children, above one year of age, half a pill, containing one twelfth of a grain, is ſufficient. If a ſpeedy cure be urged, the Peruvian bark, or other vegetable tonics, may be given at the ſame time. In children, a bark jacket, and embrocations of the ſpine with camphorated ſpirits or volatile liniment, before the period of acceſſion, are uſeful auxiliaries.

In children, and females at the age of puberty, cachexies are not unfrequent conſequences of agues; for which the following chalybeate is a very convenient remedy: ℞ *Ferrum vitriolatum* ʒ j. *acid. ſulphuric.* ℥ ſs. *aq. font.* ʒ x. *M.*—The acid diſſolves any remaining particles of iron, and gives the ſolution an agreeably acidulous taſte. Ten drops of the menſtruum contain a grain of the ſal martis, and an adult may take twenty drops, twice or thrice a-day—children from three to ten. Whether arſenic would be actually injurious or not in the ſtate of pregnancy, I cannot determine: I did not chooſe to be the experimenter. And, perhaps, ſome may ſay, that it is injudicious, in any caſe, to uſe a remedy more formida-

ble than the diſeaſe. But it is the abuſe, and not the uſe, of many potent remedies that has ſunk them into diſgrace: and, as I have given an impartial account of its uſe, in my own practice, I am not reſponſible for its conſequences with others.

In addition to the common ſymptoms of intermittent fevers, there are many incidental occurrences that merit regard. Epilepſia (occaſionalis) is a very frequent and alarming attendant in children, during the fever; but a few drops of antimonial wine, ſo as to produce nauſea, give immediate and effectual relief. And although it may be termed an unſyſtematic remedy, a reference to the immediate cauſe of the ſpaſmodic affection will remove the fallacy: for as it is a mere conſequence of inordinate action in the veſſels of the brain, whatever diminiſhes that exceſs, muſt, of neceſſity, remove the ſpaſms. If the retention of acid matter, or the preſence of worms in the alimentary canal, are ſuppoſed to be concerned, a purge of rhubarb and calomel may be given.

Enlargements of the ſpleen are not unfrequent, when the diſeaſe is neglected or improperly treated; to prevent which, proper regard ſhould be paid to the ſtate of the bowels. But when opium is given, as before-mentioned, it prevents thoſe ſchirroſities, preſerves the lymphatic ſyſtem from relaxation, and obviates dropſies: and when the ſpleen becomes ſchirrous, a gummous courſe, with mercurials, generally affords relief.

Contrary to the obſervations of the ſagacious *Lind*, the cold ſtage of intermittents, ſo far as my experience has extended, is the moſt fatal.

In all *anomalous* caſes our remedies muſt be varied according to circumſtances, without regard to ſyſtem, as human foreſight cannot provide for caſualties; though many might be mentioned, if I had not far exceeded the limits uſually aſſigned to eſſays of this kind.

I remain, dear Sir, with ſincere eſteem,
Your friend and humble ſervant,
JOHN VAUGHAN.

Wilmington, October 6, 1799.

P. S. As I have lately met with a caſe of *tetanus* analogous to the epilepſia occaſionalis afore-mentioned, it may not be improper to annex it here.—A young woman of a remarkably florid complexion, and rather diſpoſed to ebriety, had a phlegmonic ſwelling in the palm of her left hand. When

called, I found her hand much ſwelled—her arm inflamed to the elbow, attended with violent fever and ſubſultus tendinum. I then drew ſixteen ounces of blood, gave a cathartic, and enveloped the hand in an emollient poultice, to facilitate the diſcharge. It had been opened, but the diſcharge was very partial. She was conſiderably relieved of fever, and the ſpaſmodic affections, for twenty-four hours; but on the evening of the next day the pain became excruciating in the extreme, extending up her arm to her neck, with raging fever, and ſoon attended with perfect opiſthotonos. Taking advantage of the firſt interval, I gave twenty drops of antimonial wine, which releaſed the ſpaſms as ſoon as nauſea was produced: they, however, returned at intervals of two and three hours, during the next day, but were always relieved by the nauſeating potion.

This method of treating tetanus is diametrically oppoſite to the caſes mentioned by Dr. Hoſack, in Medical Repoſitory, vol. iii. p. 21 & ſeq. But, I preſume, the methods of cure are not leſs diverſified than the cauſes of diſeaſe.

J. V.

ARTICLE II.

On the ECONOMY *of* FUEL *in the* WARMING *of* ROOMS: *Communicated in a Letter from* SIMEON DE WITT, *Eſq. Surveyor-General of the State of New-York, to Dr.* MITCHILL.

My Dear Sir,

I HAVE always conſidered ſtudies, having for their object the means of leſſening the labour or expenſe neceſſary to procure the comforts of life, among the moſt uſeful in which man can be engaged. Every diſcovery made in ſuch purſuits is valuable, even if the occaſion to which it may be applied be temporary and tranſient in its nature: but if its advantages are of ſuch a kind as that a great part of the bulk of mankind may be benefited by them, not only for the preſent, but for ages to come, its value will puzzle the powers of calculation. Theſe reflections have been excited in the courſe of thinking

on the ſubject which I purpoſe now to exhibit, as conciſely as poſſible, in the various lights in which it has preſented itſelf to my view. *The beſt methods of warming rooms, in order to make them comfortable habitations in cold weather*, ſeem to me to merit an inquiry, as a ſubject ſtill very much in the dark. If, by means of the light which I can throw on it, others ſhould be led to ſuch improvements as that the worth of one cord of wood can be ſaved in the courſe of a year in any one family, I ſhall not deem my time wholly miſpent. If it ſhould lead to the ſaving of as much in as many families as I can bring to my imagination in the different towns in our cold climate which might avail themſelves of ſuch improvements, I would, with unuſual pride, look forward to the good I was about doing. And if I ſuffer my fancy to go ſtill further, and conſider that if my attempt be ſucceſsful, I may be the means of ſaving as much as would amount to a handſome national tax on future generations, I would be almoſt vain enough to think myſelf a great public benefactor. But, on a ſecond reflection, I find my vanity repreſſed by conſidering that theſe obſervations will, more or leſs, apply to every improvement; and, in truth, I intended them merely as an apology for myſelf, among many others, who waſte ſome of their time, and often to little purpoſe, in muſing on what may be done to combat the hardſhips to which our race of beings is expoſed from the attacks of the elements, and the importunities of our paſſions and appetites.

With thus much of an introduction, I ſhall proceed, without further ceremony, to my ſubject.

A given quantity of fuel, when burnt, will give a certian quantity of heat. Means may be uſed to increaſe the intenſeneſs of it, but it is not pretended that its *quantum* can be augmented. The thing under conſideration, then, is only how ſuch a given quantity of heat can be applied to the uſe intended with the leaſt waſte. The uſe intended is to warm the air of a room, and to preſerve its warmth as long as is poſſible, conſiſtent with health and comfort. This divides my inquiry into two branches, which I ſhall conſider ſeparately, and begin, *firſt*, with THE MEANS OF PRESERVING HEAT IN A ROOM.

From the properties of airs of different temperatures, it follows, that where currents of theſe meet each other, that which is coldeſt will paſs below, while that which is warmer will make its way in an oppoſite direction above it. In this

manner the air next to a fire-place being warmed, will aſcend to the ceiling, and move along it to the walls, where it will be drawn into currents that enter by the crevices of the doors and windows, and return with them, to ſerve the draught of the chimney: for the air that goes up the chimney, or, in other words, the whole draught of the chimney, muſt be ſupplied by an equal quantity of air coming into the room through ſome opening or another. The air warmed by the fire, in the paſſage which it immediately takes, as juſt mentioned, parts with the greateſt proportion of its heat to the ceiling and walls along which it moves, as well as to the entering air with which it mixes, before it can benefit us on its return in the lower part of the room; and thus the greateſt part of the heat emitted from the fire is abſolutely loſt to us. How is this to be remedied, becomes, therefore, a primary queſtion in our inveſtigation.

If we could point out a method to make the ceilings, walls, and floor, of materials that would be perfect non-conductors of heat, and, at the ſame time, could prevent freſh air from coming into the room, it is evident the queſtion would be completely anſwered; or, in other words, ſuch a room, once warmed, would remain warm forever. But no ſuch materials are to be had; and freſh air muſt be admitted into rooms; both for the purpoſes of breathing and ſupplying the draught of the chimney. All we can do, therefore, is to endeavour to come as near to this ſcheme as the nature of things will admit.

From the circumſtances ſtated, it appears obvious that very much will depend upon the materials encloſing the room. Whether they be ſubſtances that will readily or difficultly abſorb or carry away heat, will make a vaſt difference in the properties of the room. An inquiry reſpecting theſe properties, as reſiding in the different ſubſtances that may be uſed, therefore, becomes neceſſary.

If we take two wires, one of glaſs and the other of metal, and hold them between the fingers, at no great diſtance from their ends, applied, at the ſame time, to the blaze of a candle, the one made of metal will ſoon communicate an intolerable heat; while the other produces no ſuch effect. From this familiar experiment it is then apparent that metal is a ſtronger conductor of heat than glaſs, or that heat will be carried away more rapidly, and in greater quantities, from a body that is charged with it to any other leſs charged, when metal makes the communication, than when glaſs is interpoſed.

If the hand be applied to furs, or ſoft woolen ſtuffs, expoſed to the coldeſt weather, no ſenſation of cold, excepting for the firſt moment, is felt; whereas, when applied to metals, ſtones, and many other ſubſtances that have, in the ſame manner, been expoſed, the cold will be unſufferable and permanent. The philoſophy of theſe phenomena is this: *When heat, by any cauſe, is more rapidly taken from any part of the human body than it is generated by the animal functions, the ſenſation of cold is produced; and if any thing prevents its eſcape as faſt as it is thus generated, a ſenſation of heat is the conſequence.* It follows, then, that furs and woollens are ſuch imperfect conductors of heat, that when a limb is wrapt up in them they refuſe to carry off the heat as faſt as it is generated, which, in ſuch a ſituation, is ſometimes accumulated to ſuch a degree that nature is obliged to call to its aid an extraordinary ſupply of the moiſture of the body to carry it away.

Theſe inſtances will ſhow what is meant by conductors and non-conductors of heat, and how it may be determined, by trial, what the properties of different ſubſtances are in ſuch reſpects. It is, beſides, ſaid, that non-conductors of electricity are generally imperfect conductors of heat. Such, among others, is dry air; and this explains why things of a looſe, porous texture, are found warmer, to uſe the common expreſſion, than thoſe of a more compact make, as is the caſe with feather beds, quilts, blankets, baiſes, carpeting, &c. In addition to the non-conducting qualities of the materials of which they are made, it is greatly owing to the ſtagnant air contained in the vacuities of their compoſition that the paſſage of heat is obſtructed and prevented. From this, by the bye, may be underſtood the neceſſity of airing beds and bed-clothes every day, in order to expel the great quantity of moiſture they imbibe from uſe in the courſe of the night, if we expect all the warming effects they are intended to produce. A practice too much neglected, at the expenſe of health and comfort.

Theſe hints will aſſiſt the architect in the choice of his materials for conſtructing houſes beſt fortified againſt the winter's cold. Walls made of ſeaſoned timber, if my theory is right, will always be better for this purpoſe than thoſe made of ſtone or brick, and if they are made hollow they will be ſtill the better. In this view I admired a houſe built by our old friend Judge Zephaniah Platt, of Plattſburgh, which I lately had an opportunity of ſeeing. It is a frame building, incloſed

with thick boards, all the edges of which are grooved with a carpenter's plow. They are joined together by ſinking the inner edges of the upper boards into the grooves of the lower ones; while the outer edges of the lower boards go into the grooves of the upper ones. This contrivance, while it makes the encloſure perfectly tight, adds handſomeneſs to the appearance. The inner part of the wall is made of brick, maſoned up between the poſts, ſo as to leave a few inches between them and the external incloſure. By theſe means the whole houſe is, with little interruption, ſurrounded, by a hollow wall, containing a body of air, cloſely confined, to guard againſt an eſcape of heat from the rooms.

The hollow which is commonly left between plaiſtered ceilings and the upper floors to which they are attached, helps, in the ſame manner, conſiderably to preſerve the warmth of rooms. But it is to be obſerved, that the coats of plaiſtered walls and ceilings are generally made as ſmooth as poſſible; and poliſhed ſurfaces allowing circulating airs to come in contact with them in more numerous points than others would do, they will, of courſe, have the power of depriving aërial fluids of their heat with greater facility, both on account of their ſmoothneſs, and the denſeneſs of texture they have acquired by the operation giving them that finiſh, and from which they have received almoſt the properties of ſolid ſtone.

Upon the whole, I know no better way to ſecure the warmth of a room than by clothing the walls and ceiling with tapeſtry, or ſomething poſſeſſing ſimilar qualities. This would be the moſt effectual guard againſt cold, and might be done with a degree of elegance, or, if you pleaſe, with a magnificence, ſuperior to what any mode now cuſtomary affords. At the ſame time, by only varying the materials, the ſame end might be attained conſiſtent with the ſtricteſt economy. For inſtance; green baize, which is a cheap article, if handſomely ſpread along a rough caſt ceiling, would by no means make an inelegant appearance; nor would it have an unpleaſant effect if a room were entirely hung round with it. Furs, as uſed in the hats of the inhabitants of the frigid zone, anſwer the ſame purpoſe in a much more perfect and admirable manner. We, however, would object to their expenſiveneſs, as well as their ſavage appearance.

I forbear to enumerate materials that might be employed for the purpoſes in view, ſince the principles laid down will ſufficiently direct to a proper ſelection of them.

I ſhall now, *in the ſecond place*, beſtow ſome reflections ON THE MEANS OF COMMUNICATING HEAT TO ROOMS. Theſe are of various kinds: but before we take a view of them, in order to aſcertain which are the beſt, it will be proper to conſider how fire, and the heat produced by it, act.

While fuel is burning, the heat generated is conveyed to diſtant bodies in two ways. One is, in ſtraight lines or rays, carried in every direction from the fire, with the light which it emits. The other is with the ſmoke or vapour that riſes from it. The beſt contrivance to catch the heat in its flight either way, and ſubject it to our uſe, is what we are in ſearch of at preſent.

Of the heat which is ſent forth in direct rays from the fire, the proportion received into the room, compared with the whole, may be calculated on pretty accurate data. Suppoſe, in a common fire-place, the centre of the fire to be the centre of a ſphere of a given ſize, and an infinite number of rays or radii drawn from the centre of this ſphere to its ſurface, ſo as to touch the floor, jambs, and bottom of the mantle-piece; the ſpace comprehended by the lines connecting the interſections of thoſe radii on the ſurface of the ſphere, compared with the remainder of its ſurface, will give the proportion of the heat that is thrown directly into the room, compared with what falls on the hearth, chimney, jambs, and back of the fire-place, and which cannot enter the room but by reflection, or ſome other circuitous rout. From the common fire-place little heat is obtained, beſides what comes in this direct manner. It therefore muſt be obvious, governing our calculations in this manner, how much depends on the depth or ſhallowneſs of the jambs, and how much may be gained by giving the wideſt poſſible opening for the fire to ſpread its rays through a room.

It is on this principle that Count Rumford's celebrated fire-place is conſtructed, and from which it receives its principal advantages. It is true, he recommends whitening the back and jambs, with a view to gain, by reflection, the benefit alſo of the heat that may be intercepted by them; but this, in my opinion, can be but trifling.—Highly poliſhed ſurfaces only can, in a material degree, ſerve us in this reſpect; and theſe it would be difficult to preſerve in ſuch a condition.

But it is a matter vaſtly more important to arreſt and ſecure the heat which is carried away by the ſmoke or vapour riſing from the fire, as well as that which is abſorbed by adjoining

bodies, and uſually conducted to the external parts of the houſe. The quantity of heat thus loſt will appear, by calculations made in the manner before-mentioned, to be much greater than that which is thrown directly into the room.

The contrivances in common uſe, intended to anſwer this purpoſe, are chiefly the cloſe ſtove and the Franklin. The advantages of the cloſe ſtove are theſe: Its draught is ſmall, and requires, of courſe, but a ſmall quantity of cold air to be admitted into the room to ſupply it. The fire comes largely in contact with its ſides, which being of iron, readily conduct the heat into the room, and little of it is carried away by the draught. Its diſadvantages are, its inelegancy, and the diſagreeableneſs and unwholeſomeneſs of the air which it heats: it is, however, the cheapeſt method in uſe for warming a room, though it can claim, even in this reſpect, but a trifling preference to the pipe Franklin. The Franklin is either maſoned to a chimney, or placed, independent of a wall, with a pipe to carry off the ſmoke. The latter kind differs little from the cloſe ſtove, as juſt now obſerved, in its qualities for warming a room. It requires, however, more air for its draught; but, at the ſame time, it gives a direct heat in the manner of a common fire-place.—The Franklin, maſoned to a chimney, differs from the common fire-place only in this reſpect. Beſides the properties common to both, it ſends up a current of heated air from its top and ſides, which eſcapes the draught of the chimney till it has made the circuit of the room.

Beſides theſe, ſeveral other contrivances have been made, which it is not neceſſary to my deſign to make ſubjects of critical remarks. I think it proper, however, to obſerve, that the one lately communicated to the Society for the Promotion of Agriculture, Arts and Manufactures, by Mr. Stevens, is well worth attention. As it is in the nature of an appendix to the common fire-place, the heat gained by it is a clear ſaving.

I ſhall now, by way of concluſion, give two projects of my own. The one is the moſt perfect I can think of for introducing the heat of a fire into a room; the other I would call the ſimpleſt and moſt convenient: both being conſtructed with an eye to the preſervation of a due degree of freſhneſs and wholeſome reſpirability in the air.

The one to bring as much as poſſible of the heat of a fire into a room would be this: Let a pipe Franklin be placed in a common fire-place, whoſe chimney ſhould be of ſuch a

width that the pipe might run through it without touching its ſides. Let the pipe be thus carried through it beyond the top: let the top of the chimney be then cloſed round the pipe air-tight: let a tin tube, of about two inches diameter, be carried from the lower part of the buildings, on its outſide, to the top of the chimney, and there communicate with it: and, laſtly, let an opening be made from the chimney to the room, a little below the ceiling. Perhaps it will be of ſervice to have the inſide of the chimney white-waſhed. The operation of this conſtruction would be thus: The heat which would not be directly emitted into the room would aſcend with the ſmoke into the pipe, which would readily abſorb and tranſmit it to the air, in the ſpace of the chimney ſurrounding the pipe; and the current of air conſtantly preſſing into the top of the chimney, through the tin tube, would force this heated air down into the room, through the opening near the ceiling: ſo that all the heat communicated to the pipe, from its bottom to its top, would, with little exception, be carried back into the room; and this, in a high chimney, would be nearly all that is carried away by the ſmoke. The draught, moreover, would thus be ſupplied by warm inſtead of cold air. The ſame contrivance may be applied to a common fire-place, by cloſing the bottom as well as the top of the chimney round a pipe faſtened in it to carry off the ſmoke.

My other project is this: Maſon a caſt iron plate for the back of the fire-place in the uſual poſition, a few inches from the back of the chimney. Let a ſheet of plated iron be joined to the top of the back plate, and carried perpendicularly up as high as the ceiling of the room, with its edges maſoned in the ſides or jambs of the chimney, and its top bent backwards, and faſtened into the back of the chimney. From the hollow ſpace between this iron partition and the back of the chimney make ſmall openings through the jambs, one on each ſide, near the floor, and one on each ſide, near the ceiling.—The operation of this contrivance would be thus: The heat that would otherwiſe eſcape with the ſmoke will, in a great meaſure, be communicated to the iron partition, and thence to the air behind it, which would immediately aſcend, and paſs into the room through the upper openings; while the colder air would preſs into thoſe near the floor, thus making a quick circulation through the cavity between the iron plates and the back wall. By thoſe means the heat of the chimney would be drawn into the room with great rapidity; for the quicker

the ſucceſſion of freſh air, or any other vehicle coming into contact with a heated body, the greater will be the quantity of heat conducted from it in a given time.

The ſimplicity, cheapneſs, efficaciouſneſs, and conveniency of this contrivance, I think, muſt recommend it. It takes away no room; it does not affect appearances; its expenſe is trifling. In ſhort, it poſſeſſes all the good properties of the Franklin, but in a more perfect manner, and in higher degrees, without its chief inconveniences; and the firſt opportunity I have, I intend to make an effectual trial of it.

With ſincere regard,
I am, dear Sir,
Your obedient ſervant,

S. DE WITT.

Albany, December 26, 1799.

ARTICLE III.

On the INTERNAL USE *of* SACCHARUM SATURNI (Acetate of Lead) *in* DIARRHŒA: *In a Letter to* JOHN CLAIBORNE, *M. D. of Virginia.*

By JOHN ARCHER, *jun. M. D. of Maryland.*

HAVING been frequently baffled in my attempts to cure diarrhœa, particularly of the chronic kind, in purſuing the directions laid down by medical authors, I was naturally led to ſearch for ſomething, from which certain relief might be obtained in all caſes. The acetate of lead, on this occaſion, preſented itſelf to me as a medicine from which I hoped to have my wiſhes anſwered; and I here give you the reſult of my experience and obſervations reſpecting the uſe of it, in a few caſes, drawn up at the time they occurred.

CASE I.

Mr. S. R. aged 22 years, a man of a ſtrong conſtitution, was, in June, 1798, after ſevere exerciſe, attacked with a

ſevere dyſentery, which, after a continuance of about four weeks, in ſpite of every exertion to remove it, terminated in a painful diarrhœa, which continued unreſtrained until the latter end of November. His body preſented a picture of the greateſt emaciation I ever beheld. He had frequently, during this time, much pain in his bowels, and oftentimes diſcharged conſiderable quantities of blood. The Materia Medica was ranſacked, and every thing fairly tried that promiſed any relief; but in vain, until reflection ſuggeſted to me the uſe of the ſaccharum ſaturni. I at firſt had it adminiſtered to him by way of injection; but that not anſwering any purpoſe, I determined, in this critical caſe, to give it internally. I began by giving him three grains, three times a day, formed into a pill, with a little ſyrup, and left him, with directions to lay it aſide as ſoon as his purging moderated. After taking it two days, his diarrhœa had conſiderably abated; and, notwithſtanding my directions, which were particularly enjoined (for he ſaid he was fearful his purging would return or increaſe), he continued taking the pills. The conſequence was, he became coſtive. He had not a dejection for twenty-four hours, and he had extreme pain in his bowels. This, however, was ſpeedily removed, upon the operation of a doſe of Glauber's ſalt (ſulphate of ſoda), which he had taken before I ſaw him. His purging again returned; but by uſing the ſaturnine pills, which I reduced to two grains, with the neceſſary cautions, he kept his diarrhœa under, and, in the courſe of two or three weeks, it had entirely left him. He recovered, in the courſe of the winter, his fleſh and ſtrength, and, although not quite ſo ſtrong, he ſays he is as well as he ever was in his life.

Case II.

Mr. C. L. about 35 years of age, was, in the month of November, the ſame year, ſeized with a violent dyſentery. It continued eighteen days, and terminated in a ſevere diarrhœa, which reduced him greatly. After uſing the uſual medicines recommended for ſuch caſes, without any kind of relief, I put him upon the uſe of the ſaturnine pills, two grains three times a day, with the particular directions; and, in three days, his diarrhœa was entirely removed, without the occurrence of an unpleaſant ſymptom. He rapidly recovered fleſh and ſtrength, and is now perfectly well.

Case III.

Mr. W. M. about 50 years of age, with a diarrhœa of two months ſtanding, began the uſe of the ſaturnine pills under my direction. They removed it, in a few days, without any ſymptom of cholic taking place. He was recovering ſtrength rapidly—went out from home, and did not return until a late hour of a damp night. He relapſed, and died in four days.

I could give you ſeveral other caſes in ſupport of the efficacy of the acetate of lead in diarrhœa, but I preſume I have given a ſufficient number to warrant a trial of it. I have found it a valuable medicine in the diarrhœa that we often find take place in low fevers, phthiſis pulmonalis, &c. I here ſubjoin an extract of a letter I received from my worthy and ingenious friend, Dr. William Harris, of Mifflin County, Pennſylvania.

"*Belle-Fonte, Auguſt* 30, 1799.

"Dear Sir,

"I received your favour of the 4th of July, mentioning the great benefit you have derived, in your practice, from the internal uſe of ſaccharum ſaturni in diarrhœa. Since then I have had opportunity of making uſe of it in two caſes, and am happy to inform you that the reſult confirms your practice. One patient, a child of three years of age, had been four days violently purged: its motions were every half hour, or oftener. I gave it the third of a grain of the acetate of lead every hour, in the form of a pill; and, in twelve hours, the diarrhœa had entirely left it. The other was a child two years old: it had been labouring under a continual purging ſince it was three months old: the fæces were frequently mixed with blood. I had previouſly given it all the medicines I could think of without any good effect. The child was reduced to a mere ſkeleton, but had a good appetite.—I gave it the third of a grain of the ſaccharum ſaturni every two hours, formed into a pill. In two days the diarrhœa had entirely left it, and it is now recovering in fleſh and ſtrength. The firſt of theſe caſes might, I make no doubt, have yielded to the ſeveral remedies in ſuch caſes, had I exhibited them; but the other, which was chronic, was, beyond every doubt, cured by the ſuperior virtues of the ſaccharum ſaturni. From the trifling experience I have had of it, I conſider it as an important and valuable medicine in diarrhœa.

"WILLIAM HARRIS."

Whether diarrhœa depends upon an increaſed action of the blood-veſſels of the bowels, or upon a retrograde action of the inteſtinal abſorbents; whether the ſaccharum ſaturni cures by leſſening the action of the ſanguiferous veſſels, or by increaſing a proper action of the inteſtinal abſorbents, are queſtions of no ſmall magnitude. I do not, however, heſitate to ſay, that in all caſes of diarrhœa there is an increaſed action of the blood-veſſels of the bowels: indeed, we often, even in chronic diarrhœa, find this exceſs of action in the pulſe. The operation of the acetate of lead appears to be the diminiſhing the action of the ſanguiferous veſſels, and equalizing the ratio of action between the ſanguiferous and abſorbing veſſels. Now, whether the action of the abſorbents is increaſed poſitively, or only relatively, is not ſo eaſy to determine. It is certain, that in this diſeaſe the periſtaltic motion of the inteſtines is increaſed, and it appears probable that the diminution of arterial action, a well known effect of the ſaccharum ſaturni, produces a more regular periſtaltic motion.

I find there are many inſtances on record, to prove the deleterious effects of lead upon the human body, when long perſiſted in, or taken in large quantities. From theſe facts, the practice I have here recommended will, no doubt, by many, be conſidered, at beſt, as raſh and hazardous: but, becauſe, under ſuch circumſtances, it has produced colica pictonum, convulſions, and death, ſhould theſe be reaſons why its preparations ſhould not be adminiſtered in diſeaſes, in moderate doſes, under the direction of a cautious and judicious phyſician? By no means. What are the conſequences of large doſes, or a long continuance of opium, ſtramonium, arſenic, &c. exhibited by the ignorant and injudicious?—Equally dreadful: tremors, vomiting, vertigo, convulſions, and death. And, on the other hand, what are not the good effects of theſe medicines, when adminiſtered with judgment and care? Let the practitioner of medicine anſwer for himſelf. I have often thought of the propriety of the aſſertion made by an Engliſh phyſician, and I think it applicable in the preſent inſtance, that "poiſons, in ſmall doſes, are the beſt medicines, and the beſt medicines, in large doſes, are poiſonous."

Dr. Reynolds, of London, in a letter to Sir George Baker, has given us ſome caſes of hæmorrhagia uterina, hæmoptyſis, &c. in which he had uſed the tinctura ſaturnina, and ſaccharum ſaturni, with the greateſt and moſt decided advant-

age.* Dr. Reynolds appears to think that the thebaic tincture, adminiſtered with the ſal plumbi, will prevent cholic taking place. It may be ſo; but I conceive that if a conſtipation of the bowels were prevented during the uſe of it, no ſymptom of cholic would appear. Dr. Barton, you may recollect, in his learned and ingenious lectures on the Materia Medica, mentioned that it had been made uſe of by ſeveral phyſicians, in hæmorrhagies, with good effect. Might it not be given, with advantage, to children in cholera infantum, a diſeaſe ſo prevalent, and which every year ſwells the bills of mortality in our cities? As dyſentery depends upon an exceſs of action in the blood-veſſels of the bowels, and as the ſaccharum ſaturni poſſeſſes the property of leſſening that action, what would be the effect of it in that diſeaſe? It is, in my opinion, in the hands of a judicious practitioner of medicine, a ſafe and valuable article of the Materia Medica. I hope a few trials will induce you to think favourably of it.

JOHN ARCHER, *jun.*

January 6, 1800.

* Vide Duncan's Med. Comment. vol. vi. Philadelphia edit.

ARTICLE IV.

ON THE SUBMERSION OF SWALLOWS.

From an Anonymous Correſpondent.

To the EDITORS *of the* MEDICAL REPOSITORY.

Gentlemen,

I OBSERVE your correſpondent, Mr. Peter Cole, in No. 2 of vol. ii. of your Repoſitory, has revived the opinion, which I thought had been exploded, of the watery ſubmerſion of ſwallows. This ſubject has been, for a length of time, agitated by naturaliſts. The Swediſh philoſophers are unanimous in the affirmative, and Kalm, in his travels through this country, gives a ſtatement of all the facts that ſupported the opinion in his native country. Meſſrs. Pennant, John Hunter, and Smellie, are decidedly oppoſed to the opinion. It

would take up too much room in your Repoſitory to detail all the arguments againſt it; but a ſummary of them may be uſeful to thoſe who have not yet examined the merits of both ſides of the queſtion.

The arguments againſt the opinion of ſubmerſion are derived,

1. From the impoſſibility of any land animal exiſting without reſpiration.

2. The want of that ſtructure of the internal organs of the ſwallow which is eſſential to the exiſtence of all animals under water.

3. From the ſpecific levity of the bird. This is ſo great, "that their continuing for months under water amounts (ſays Smellie) to a phyſical impoſſibility."

4. From their certain deſtruction by ſeals, otters, fiſh, turtles, and eels.

5. "From the impoſſibility of their moulting, while in a ſtate of torpidity, at the bottom of lakes; (as they moſt certainly do change their plumage while abſent from us.")*

Upon a firſt view of this ſubject, and of the above arguments againſt the opinion of ſubmerſion, we would be diſpoſed to doubt the poſſibility of ſuch an event; but your correſpondent, Mr. Cole, ſpeaks poſitively as to the fact, and ſays that, "in the twinkling of an eye, they diſappeared under the water, and roſe no more." It is far from my intention to doubt the word of your correſpondent. I believe he relates what he thinks he diſtinctly ſaw. But, is it not poſſible he may have been miſtaken? He ſays he "was ſtanding at the edge of the pond with his ſpy-glaſs;" and if he depended upon following the birds in their very rapid and irregular flight with that inſtrument, I believe no one would heſitate a moment in ſaying that it is impoſſible for him, or any other perſon, to ſpeak poſitively as to the cauſe of the diſappearance of the birds; and, it is more than probable, they ſuddenly alighted upon the edge of the water, at the corner of the pond moſt remote from the ſpot in which he ſtood. For my own part, I am diſpoſed to think this was the caſe, and *I wiſh he would have the goodneſs to inform us, whether he actually ſaw them plunge into the water, and ſaw the waves which muſt have enſued their ſubmerſion.* If he anſwers in the affirmative, I will give up the controverſy; but if otherwiſe,

* Gent. Mag. for April, 1796.

the mere "diſappearance" of the ſwallows cannot be admitted as a certain proof of their ſubmerſion.

Without depending upon the arguments adduced above, againſt the poſſibility of the ſubmerſion of ſwallows, I think the following experiments ſatisfactorily prove that this ſtate is incompatible with the future exiſtence of theſe birds. They are related in the Gent. Mag. for June, 1796.

"Some of the laſt days of May being cold, wet, and windy, I obſerved that the *hirundines*, in general, became leſs active, and manifeſted much the ſame appearance as they do at the cloſe of the ſeaſon, when they are about to leave us; and, particularly on the 31ſt, they were ſo enfeebled by the rough cold gales and heavy ſhowers, that, in the courſe of the day, many were eaſily taken by the hand, ſitting torpid under the eaves of houſes, and other places of ſhelter; even the ſwifts were ſo benumbed and tired as to ſettle on the hands and heads of ſeveral perſons who were obſerving their uncommon appearance in the meadows. I had ſeveral *hirundines* brought me in the evening, which appeared to be dying. Their eyes were cloſed, and their wings drooping, ſo that they would continue in any poſition in which they were laid. I wrapped ſome in flannel, and depoſited them in a warm room, and, in leſs than an hour, they became as active as I ever obſerved them; but, on expoſing them to the cold, they became torpid as before; in which ſtate I affixed weights to the feet of two of them, and carried them to the meadows whence they were taken, and immerſed them gradually in a ditch, among ruſhes, where I had obſerved the firſt that made their appearance this year, that, if they had emerged thence, the experiment might be tried in the water and place that had preſerved them throughout the winter. I immediately had cauſe to conclude they were drowning; for, when they firſt came in contact with the water, it rouſed them from their lethargy, and, when fully immerſed, the air eſcaped from them copiouſly, cauſing large bubbles on the ſurface of the water. In this ſituation I left them till early the next morning, when I eaſily recovered them from the bottom of the ditch by a ſtring that attached to them. Having taken them home, I depoſited them in wool, and placed them at a conſiderable diſtance from my kitchen fire. At intervals I removed them nearer; ſo that, in about three hours, their plumage was dried, and, in an hour more, their bodies had acquired a natural blood-heat; but not the leaſt ſigns of re-animation appeared: ſo that, when I deſpaired

of recovering them by the aid of the fire, I placed them full in the warm rays of a forenoon's ſun, where I ſuffered them to continue till the meridian, when they remained as torpid as ever. That they might receive every poſſible aſſiſtance, I then tried the powers of electricity, but equally in vain; for, though the friction was increaſed ſo as to expand their wings, their life had for ever fled! and, in two days more, their bodies were haſtily becoming corrupt; whilſt thoſe that were *preſerved* from the *genial* fluid, through the influence of the warm ſun, the next morning took their flight in the more beneficent element of air."

In addition to the above convincing proofs, the following may be given. They are taken from the Gent. Mag. for May, 1796. The writer ſays the facts were ſtated to him by the late Mr. John Hunter, of London, whoſe enthuſiaſm for the proſecution of experimental knowledge is well known.

"In the month of September he prepared a room, with every accommodation he could contrive, to ſerve as a dormitory for ſwallows, if they were diſpoſed to ſleep in winter. He placed, in the centre, a large tub of water, with twigs and reeds which reached to the bottom. In the corners of the room he contrived artificial caverns and holes, into which they might retire; and he laid on the floor, or ſuſpended in the air, different lengths of old wooden pipes, which had been formerly employed in conveying water through the ſtreets. When the receptacle was rendered as complete as poſſible, he then engaged ſome watermen to take, by night, a large quantity of ſwallows that hang upon the reeds of the Thames about the time of their departure. They brought him, in a hamper, a conſiderable number, and ſo nicely watched the time, that on the very day following there were none to be ſeen.

"He put the ſwallows into the room ſo prepared, where they continued to fly about, and occaſionally to perch on the twigs, &c. but not one ever retired to the water, the caverns, holes, or wooden pipes, or ſhewed the leaſt diſpoſition to grow torpid. In this ſituation he let them remain until they all died but one. This appearing to retain ſome vigour, was ſet at liberty, when it mounted out of ſight, and flew away. All the birds lay dead, ſcattered about the room, but no one was found aſleep or torpid, or had (if I rightly remember) crept into any of the receptacles he had ſo provided."

The firſt of theſe experiments ſhews, that ſwallows, like all other animals in which the circulation is carried on, as in our-

ſelves, cannot revive after ſubmerſion any length of time: and, allowing the narration of Mr. Hunter's experiments to be accurate, they prove that neither ſubmerſion nor hybernation are eſſential to ſwallows. But it is a well eſtabliſhed fact, that ſwallows have been found in a torpid ſtate in banks, old trees, and dry wells, during the winter, and alſo at the bottom of ponds when drained.* It would ſeem, therefore, that ſome animals, when confined, will not purſue the ſame courſe of procedure as when they are at perfect liberty: and the fact of the elephant, which has never been known to increaſe in a menagerie, might be brought in proof: but to this, again, may be oppoſed that of the rattle-ſnake, and of other animals which hybernate, whether they are in a houſe or are free. The repetition, therefore, of Mr. Hunter's experiments, would be well worthy the trouble of thoſe who could conveniently attend to them.

But granting that ſwallows do actually bury themſelves under water during winter, it muſt be recollected that this is not all we have to conſider. A queſtion of equal importance is, Who has ſeen ſwallows coming out of ponds, rivers, or lakes? Unleſs this can be proved, it will reſult, that nature orders a certain ſpecies of ſwallow to be annually deſtroyed; for deſtruction muſt follow their reſidence in mud or water, unleſs it can be ſhown that the ſame effects will not follow from ſimilarity of organization in different animals.

That ſwallows do migrate has been proved beyond a doubt, by Mr. P. Collinſon, from the teſtimony of the late Sir Charles Wager, on board of whoſe ſhip, in the Britiſh Channel, they alighted, apparently exhauſted, after a long flight. Mr. Adanſon alſo proves the appearance of thoſe birds in Senegal, during the winter. No doubt remained of their identity; for, having caught four of them, he found them to be the true European ſwallow. Mr. White, in his Natural Hiſtory of Selborn, likewiſe mentions his having ſeen, on Michaelmas day, a large flock of ſwallows flying towards the ſea.

Linnæus enumerates twelve ſpecies of the hirundo; of theſe, four are found in Pennſylvania, according to Barton, viz.

Hirundo purpurea, or purple martin.

Hirundo ruſtica, or houſe ſwallow.

———— ————, or little bank martin.

Hirundo pelaſgia, or chimney bird.

* Tranſ. Acad. Sciences, Boſton.—Pennant.

He thinks they are all migratory birds. But he admits that ſwallows have been found under mud, and in the hollows of decayed trees, during that very ſeaſon when it is ſuppoſed thoſe birds are in a more ſouthern climate. "Theſe inſtances, however," he thinks, "only ſhew the accommodating powers of birds, which ſometimes continue in a country the whole year through, and, in other times, migrate from thoſe countries." But this explanation will not ſatisfy us as to the contradiction between the recovery of the bird after a winter reſidence in mud, and the ſtructure of its vital organs. Theſe events could not take place merely from an "accommodating diſpoſition." As an anatomiſt, he muſt know that they muſt depend upon the organization of the bird; and I ſhould be happy to have his ideas upon this ſubject communicated through the medium of the Repoſitory.

ARTICLE V.

A SHORT ACCOUNT *of an* EPIDEMIC YELLOW FEVER *which prevailed in the Autumn of* 1798, *in the Village of Port-Elizabeth, New-Jerſey: Communicated in a Letter from Dr.* GEORGE LEE *to Dr.* MITCHILL.

Sir,

THE weather which preceded, and exiſted during the continuance of the diſeaſe, together with a deſcription of Port-Elizabeth, as reſpects its ſituation, I will tranſcribe from a letter which is in my poſſeſſion, addreſſed to my brother, James Lee, by Dr. Azel Peirſon, in anſwer to ſome interrogations drawn up by myſelf. Dr. Peirſon practiſed phyſic in Port-Elizabeth at the time the epidemic exiſted there, and was then the only phyſician of reſpectability in that place.

"The weather that preceded, and exiſted during the prevalence of the diſeaſe, was hot and dry, with the wind generally from ſouth to ſouth-weſt, or weſt: in the meantime ſome ſhowers of rain, though few.

"Port-Elizabeth is ſituated upon a neck of land of a moderate height, and level; remarkably ſandy; covered chiefly with pine timber, and ſome oak. On the eaſterly ſide there

is a ſmall creek, at the diſtance of one mile; from the mouth of which, upwards, for about three fourths of a mile, there is a large body of drained meadow, generally more damp than what is uſual in that neighbourhood. On the ſouth, diſtant from three fourths to one mile, is *Maurice River*, which, as far as the tide ebbs and flows, is, on its ſides, remarkably muddy and miry. Back from this there is fine meadow, high and dry, until you approach the upland, where there are large bodies of ſwamp, which are muddy, and generally with more or leſs water on their ſurface. This is more eſpecially the caſe on that ſide of the river which is oppoſite to Port-Elizabeth. That which is on the ſame ſide, and more immediately in the neighbourhood, is high, and much better drained; though here, in ſome places towards the ſhore, it is low and wet. On the north-weſt ſide, and paſſing by the village, there is a ſmall creek, bounded by high and dry meadows. On the oppoſite ſide of the creek, at the diſtance of from one fourth to a half mile, there are ſeveral pieces of wet ſwampy ground, generally dry in the ſummer ſeaſon."

In addition to what is here quoted, it is to be obſerved, that the creek on which Port-Elizabeth is ſituated, called *Manimuſking*, is a branch of Maurice River. This creek, ſome years ago, ran a north-weſterly courſe, and was navigable, many miles above the town, to wood-ſloops; but, within a few years, its courſe was obſtructed, at the place where the village ſtands, by the formation of a dam acroſs the tide. This circumſtance, which ſtill continues, has given riſe to the name *Dam*, by which the place is yet vulgarly denominated. The waters of this creek, as well as thoſe of Maurice River (even from the Delaware Bay, into which it empties, to the place where it ceaſes to flow), are, according to the united teſtimony of every perſon who lives in the country, generally muddy, except in a very dry time. The meadows on each ſide of the river and creek, eſpecially thoſe on the latter, are commonly drained by means of ditches cut through them, at the mouths of which are placed ſluice-gates,* which permit a quantity of water to enter ſufficient (nearly) to fill them at high tide, and, as the tide falls, ſuffer it to paſs out; by which

* The intention of thoſe gates is to prevent the paſſage of water through them into the meadows; but it ſo happens, that, from inattention, this is ſeldom carried into effect completely; as, at every tide, water, in conſiderable quantity, does make its way through them. This is more eſpecially to be remarked of thoſe on the ſouth, and in the vicinity of Port-Elizabeth.

proceſs the ditches are emptied at low water. That ſide of the creek on which the town ſtands, for two or more miles below it, the meadows are all banked, and not natural. It is about fifteen miles from the mouth of Maurice River to Port-Elizabeth.

Another circumſtance, which has not been mentioned, deſerves peculiar notice, as it was ſuppoſed, by ſome, to be the ſource of all the evil—I mean a moraſs on the north-weſt ſide of the tavern in which the firſt caſes of the diſeaſe occurred, as will be mentioned hereafter, about 120 paces from it. It was a low piece of ground, five poles long, and one or more wide, on which water ſtagnated, and vegetation commonly flouriſhed. A diſagreeable exhalation having been perceived to ariſe from this fen, before and after the diſeaſe made its appearance, it was determined among the people that it ſhould be cleared. Upon examination, the weeds which uſually grew in it were, for the moſt part, dead, and in an advanced ſtage of putrefaction; and the water which lay upon its ſurface was (to uſe their own expreſſion) *quite ropy*. From this filthy place the moſt reſpectable of the inhabitants of Port-Elizabeth derived the origin of their fatal diſeaſe.

The following are the ſymptoms of the diſeaſe, contained in the letter above mentioned, by Dr. Peirſon. "The diſeaſe commenced by chills and ſhivering, ſucceeded by an increaſe of heat, general pain, more eſpecially of the head, back, and breaſt: the pulſe more properly hard than full—more properly frequent than quick: a turgidneſs of the ſmall veſſels of the outer coat of the eye uniformly attended: the yellowneſs of the ſkin varied. In ſome caſes it was quite conſiderable from the commencement; in others ſcarcely diſcernable till a little before death; in others not till after death, when, in all caſes, it immediately took place to a very high degree. Vomiting, or naufea, took place as the diſeaſe was more or leſs violent; and, in ſome inſtances, a lax attended. There was generally an abatement in the violence of the complaint in the morning, till about ten o'clock."

The diſeaſe began on the 9th day of Auguſt, 1798, at which time the yellow fever was ſcarcely epidemic in any part of the United States. On that day four perſons (three of whom lived in the ſame houſe—the tavern) were taken ill of a fever very nearly about the ſame time. William Larraſon, inn-keeper, Mary his wife, Levi Heaton, ſchool-maſter, and Abiah Cobb, ſervant maid, were their names. The three

firſt died, and the laſt recovered. William Larraſon died on the 12th Auguſt, Heaton on the 13th, and Mary Larraſon on the 15th of the ſame month.

The ſudden attack of diſeaſe on four people of the ſame dwelling, as it were (for I believe they were all ſeized in the tavern), and the mortality conſequent upon it, ſoon produced an alarm among the inhabitants of Port-Elizabeth.* Dr. Peirſon, who was their phyſician, found the diſeaſe under which they laboured "much reſembled the yellow fever," for he had ſeen it before. In order to account for its origin, about which he was much concerned, he made ſtrict inquiry whether there had been any intercourſe betwen Port-Elizabeth and any other place in which the yellow fever exiſted, and whether his patients had viſited people ſick of the ſame diſeaſe. Upon examination, "he found there had been communication with Philadelphia, both by land and water; but could find no inſtance of any perſons having been ſick on their paſſage (except the caſe of Perkins, mentioned below) to or from Philadelphia, or after their arrival at Port-Elizabeth." From all the information I received on this ſubject, which was diſcountenanced by no one, I am authorized to declare, that none of the four above-mentioned perſons had been from home for many weeks previous to their attack: and that they had not viſited a perſon ſick of the yellow fever in that year I know to be a fact. This circumſtance made Dr. Peirſon heſitate to pronounce his opinion on the nature of the diſeaſe, till after its fatal termination in two of his patients, when all doubts on the ſubject were removed, and his ſuſpicion of it being the yellow fever ſatisfactorily confirmed.

Having viſited Port-Elizabeth in the month of July of the preſent year, I was curious to inveſtigate the hiſtory of the diſeaſe. From my notes in this examination, I find the four perſons already named were the firſt patients in the diſeaſe. The ſtage which goes from Bridgeton to Cape-May, through Port-Elizabeth, being the only way in which they could have received the diſeaſe by land, I converſed with Mr. Hopkins (the proprietor and driver of it at that time) particularly on the ſubject, who informed me that he never carried a ſick perſon in his ſtage waggon before the 9th of Auguſt, and that, during the whole period of time in which the yellow fever

* In conſequence of this alarm, one half of the inhabitants fled from the village, and continued from home ſeveral weeks.

prevailed in Philadelphia, he carried but three paſſengers who had that diſeaſe; and none of theſe were conveyed as far as Port-Elizabeth. This being the only channel through which the diſeaſe could be conveyed, by land, to Port-Elizabeth, from any diſtant place, my next inquiries were directed to its importation by water. One Perkins, a ſhallopman, arrived at Port-Elizabeth, a few days before the 9th of Auguſt, from Philadelphia. He was in good health when he left this city, continued ſo on his paſſage, ſailed again in perfect health from Port-Elizabeth, after having enjoyed the ſame there, became ſick on the paſſage, and died before he arrived at Philadelphia. It was about ten days from the time he left Philadelphia until he ſailed from Port-Elizabeth on his return; which laſt mentioned place he left two or three days after the attack of Larraſon, &c. This was the only caſe I was able to find, which could create a ſuſpicion of the diſeaſe being imported. The people of Port-Elizabeth, however, did not believe that contagion was conveyed to them, either in the body, the clothes, or the veſſel, of this unfortunate man. So far from believing this to be the caſe, they conceived it more probable that he had received the ſeeds of the yellow fever among them, than that he brought them with him from Philadelphia.*

Ruth Peterſon was the next caſe of the diſeaſe which made its appearance in Port-Elizabeth. She was taken on the 10th of Auguſt, and died on the 17th following. She lived nearly a quarter of a mile ſouth-eaſt of the tavern in which Larraſon, &c. lay ill. She had no connection with any ſick perſon for ſome conſiderable time before, nor with any thing elſe from which ſhe could have got the diſeaſe by contagion.

The next caſe was that of Iſaac Marford, who was taken ill at the mouth of Maurice River, when on a fiſhing party from Port-Elizabeth, on the 15th of Auguſt, and died on the fifth day of his indiſpoſition, in extreme agony. He left Philadelphia exactly ten days previous to his attack, where he had been about one week. He ſailed down in a veſſel belonging to Milville (commonly called Maurice River Bridge), eight miles above Port-Elizabeth, where he landed. He was the

* Since this account was drawn out, I have been informed, by one of the inhabitants of Port-Elizabeth, that Perkins did not ſail from Philadelphia, but from a place, a few miles below Marcus-Hook, called Grubb's Landing. Be this as it may, however, you will, I am ſure, agree with me, that this man did not communicate the diſeaſe to Larraſon, &c.

only perſon who had been in Philadelphia of all who had the diſeaſe in Port-Elizabeth. The reſt had not even been from home for a conſiderable time before being ſeized with the diſeaſe.

Having thus given the hiſtory of the firſt ſix caſes, and, of courſe, gone far enough to account for the origin of the epidemic, it would be ſuperfluous to particularize any ſucceeding caſe: ſuffice it to ſay, there were, in all, thirteen genuine caſes of yellow fever in this little place,* ſix of whom died.

Before bringing this account to a concluſion, it is not unintereſting to obſerve, that along the courſe of Maurice River, from Milville to Lee's-Burgh, which is thirteen miles, caſes of yellow fever made their appearance. Theſe were in proportion to the number of inhabitants; and in no inſtance did a caſe occur at any great diſtance from the ſhore. The number of caſes which I have been able to collect, which occurred within this ſmall diſtrict, amounted to twenty-four (excluſive of thoſe at Port-Elizabeth), of whom ſixteen died, and eight recovered. A number of them took the diſeaſe in Philadelphia; and it is no leſs true, that a number owe it to local cauſes, and thoſe not of a contagious nature. One of the moſt remarkable of this number was that of Abigail Albertſon, aged ſix years, in whom the yellow fever was terminated by the black vomit, on the 9th day of September, having been ſick ſix days. She lived about two miles below Port-Elizabeth, and had not been there, nor at any other place from home, for more than eight weeks previous to her attack. Many of the family had been at Port-Elizabeth, &c. but none, except this child, became ſick during the whole autumn; and the only chance the child had of receiving the diſeaſe by contagion was in the following manner:—A man who came from Philadelphia in a ſloop, was taken ill after his arrival in the River Maurice; and, twenty-four hours after his attack, came upon deck, fell overboard, and was drowned; ſuppoſed, by the crew, to have been vertiginous. This accident happened one mile below Albertſon's. About five days after this, the body aroſe to the ſurface of the water, and floated up the river by Albertſon's houſe (which ſtands on the ſhore), and was ſoon after buried ſome diſtance above. The child (Abigail) was carried within eighty yards of this

* There were, at the time, nineteen dwelling houſes in Port-Elizabeth, and the number of the inhabitants amounted to ninety-ſeven.

drowned man before he was buried, when the wind was blowing directly from the child to the corpſe; and, two days after, was taken ill of the diſeaſe of which ſhe died. No phyſician ſaw the man, to determine the nature of his diſeaſe; but it is moſt probable it was the yellow fever. It is the unanimous opinion of the family, that the child did not catch the diſeaſe from any ſick perſon (becauſe ſhe had ſeen none), nor from this dead body. This information I received from the parents of Abigail Albertſon, as well as from many of their neighbours. I viſited the place where the man was buried, &c. and truſt to the facts mentioned.

I could adduce many other inſtances to prove the domeſtic origin of the yellow fever, as it prevailed in different parts of Cumberland county, beſides what I have already related; but I will not treſpaſs upon your time any longer. Permit me to obſerve, that I could not find a ſingle inſtance, after all my inquiries, wherein the diſeaſe unequivocally proved itſelf contagious; and that, in Port-Elizabeth, the epidemic was checked about the latter end of September, by the *coldneſs* of the weather, *not* by the *wetneſs*.

All the facts that I have related, if it were neceſſary, could be ſubſtantiated upon the teſtimony of ſeveral reſpectable perſons; and, as far as I have carried my inquiries, I have met with a coincidence of report not often to be found on the ſubject of malignant fevers. I can truly ſay, that in no material point have any of my informants diſagreed; and I hope I am too ſenſible of the value of juſt ſtatements in the eſtabliſhment of truth, to render a falſe report, in order to give weight to any particular opinion. Viewing, therefore, the facts which I herein tranſmit you, with that candour which ought to ariſe on the ſubject, it certainly is no more than juſt to obſerve, that this fever took its riſe from domeſtic cauſes; and when we conſider that no perſon in Port-Elizabeth and its vicinity believes otherwiſe than that it had a local origin,* we muſt attribute its generation, if not its continuance, to this ſource. The caſes were few indeed, when compared with thoſe which have taken place in Philadelphia and other places; but, then, their number was much ſuperior in proportion to the number of inhabitants; and they are of the very firſt importance, in as much as the facts ſtand undoubted.

* It is a curious circumſtance that I could not diſcover a diſſenting voice from this opinion.

It is much to be regretted, that, in every department of ſcience, the human mind, in endeavouring to explain the various phenomena of nature, too quickly imbibes the prejudice and ſuperſtition of the world, and too often graſps at weak and inſignificant holds to ſupport its folly. This is more eſpecially the caſe in the ſcience of medicine; and had I no other proof of the truth of this poſition than the following anecdote, it would be ſufficient to eſtabliſh it to my conviction. After many fruitleſs attempts to account for the firſt caſes of malignant fever which occurred in Port-Elizabeth from a diſtant ſource, no better method could be deviſed to explain its origin in this way, than by attributing it to handling ſome loaf-ſugar which had been conveyed to them by the ſtage from Philadelphia. Whether it is poſſible that loaf-ſugar can infect a perſon with a malignant bilious fever, after having been carried no leſs than ſixty miles, I muſt leave you to determine.

I am, reſpectfully,
Your obliged friend,
GEORGE LEE.

Pennſylvania Hoſpital (Philadelphia), Aug. 29, 1799.

ARTICLE VI.

ON CRYSTALLIZATION.

To the EDITORS *of the* MEDICAL REPOSITORY.

Gentlemen,

THERE are, perhaps, no phenomena in nature which have cauſed more wonder and admiration, and, at the ſame time, more completely ſet all attempts to inveſtigate their cauſes at defiance, than thoſe of cryſtallization. That the ſame ſubſtance ſhould, when left to depoſit itſelf regularly from a ſtate of ſolution, almoſt always put on the ſame form, and that the forms thus aſſumed ſhould be ſo various, and yet ſo regular and appropriate, has excited the admiration of

philoſophers ſo highly, that ſome have not even heſitated to aſcribe life to them.

Many attempts have been lately made to inveſtigate the true foundations on which this curious law of nature reſts, but, I fear, with little ſucceſs. *Certain polarities* have been aſcribed to the particles of which cryſtals are compoſed: thus, by *certain attractions and repulſions*, when they are left to move freely in a fluid, *certain ſubſtances* aſſume *certain forms*—which is juſt as much as to ſay *we know nothing about it.** Newton was the firſt who advanced the ſuppoſition of its being cauſed by the figures of the *ultimate particles* of bodies and their different arrangements. Romme de Liſle has written a large treatiſe on the ſubject, in which he endeavours to diſtinguiſh, in the cryſtals of all analogous or identical ſubſtances, the ſimple modifications of a primitive form. The Abbe de Hauy has endeavoured to go ſtill further. He has not only adopted the conjecture of Newton relative to the forms of cryſtals depending on thoſe of the *ultimate particles*, but has endeavoured to determine what theſe forms are. He has attempted to reduce them to ſix. 1. The parallelopipedon in general, comprehending the cube, the rhomboid, and all ſided ſolids, when oppoſite ſides are parallel. 2. The regular tetrahedron. 3. The octahedron, with triangular ſides. 4. The hexagonal priſm. 5. The dodecahedron, bounded by rhombs. 6. The dodecahedron, bounded by iſoceles triangles.† I ſhall not here enter on the conſideration of the various modes in which he combines theſe primitive forms, to produce all the variety of cryſtals nature preſents to us. All that I mean to do is to ſhew that many very regular forms are produced by cryſtallization, without being the reſult of any regular formed particles. If I can do this, I ſhall conſider it as a refutation of his theory: for if it can be proved, that by the union of particles, without any determinate

* In the laſt volume of the Iriſh Tranſactions there is a poſthumous paper of Mr. Kirwan's, in which he aſſumes this doctrine, and, by it, attempts to account for magnetiſm. It is well worth reading, as a happy illuſtration of the length to which hypotheſis may be carried.

† I have never read either the writings of de Liſle or de Hauy: if, therefore, there is here any miſrepreſentation of their theories, it is chargeable alone to thoſe writers from whom I have collected them. I am perſuaded, however, from the corroborating repreſentation of ſeveral writers, that this muſt be a tolerably faithful account of their theories: if not, my objections will ſtand againſt the theories promulgated by the different authors in their names.

form, regular cryſtals are ſometimes produced, I cannot ſee the propriety of ſuppoſing the particles of which cryſtals are formed to have certain and determinate forms; for it is nothing more than a ſuppoſition, made for the purpoſe of explaining the regular forms of cryſtals. Mr. Hauy, it is true, *diſſected*, with conſiderable accuracy, as far as ſuch *diſſections* could be carried, cryſtals of carbonate of lime, and many others which break into regular forms, and determined what were the forms of the leaſt of the regular figured particles he could procure. But what is to convince us that they were not themſelves formed of *amorphous* particles, eſpecially if I can ſhew that regular forms may be produced by the union of ſuch particles?

Cryſtallized granites are not, as far as I can learn, common in Europe; but in this country they are very common, eſpecially ſecondary granites. I have ſcarcely ever ſeen a conſiderable quantity of theſe without obſerving either regular cryſtals among them, or an evident tendency to cryſtallize. Theſe cryſtals are often found very regular. I have ſome by me, which I brought from the Cahnawaga ridge, which are as regularly cryſtallized as any baſaltes I ever ſaw.* Theſe cryſtals, in my opinion, totally deſtroy the theory of de Hauy. They are compoſed of the moſt heterogeneous and *amorphous* particles, and yet are of a very regular figure.† The following are the appearances which ſeveral of them, from different places, preſented.

I broke a number of rhomboidal cryſtals of granite, which I found within a few miles of Philadelphia. They abound in the neighbourhood of this city. They all appeared to be ſecondary granites, compoſed of quartz, mica, and felſpar. I examined the fracture with a microſcope, and all the particles appeared *amorphous*.‡

A tetrahedral cryſtal of granite, from the little falls of Po-

* How are theſe cryſtallizations effected? Evidently not by ſolution; and the grains are ſo large as not to admit of being long ſuſpended in water.

† This certainly will not be replied to by ſaying, that though the *grains* of which theſe granites are compoſed are *amorphous*, yet the ultimate particles are regularly formed, as the form of the cryſtal cannot depend on the form of theſe particles, but on that of the *grains*, if it depended on the form of its conſtituent principles.

‡ In the granite rocks, in this neighbourhood, the mica is often found cryſtallized as well as the felſpar, which is very beautifully cryſtallized. But I have never ſeen either of theſe, in any cryſtals of granite, ſhewing any ſigns of cryſtallization.

towmack, appeared to be compoſed of mica, quartz, and felſpar; the mica being by far in the greateſt proportion. The mica was in ſmall plates, but without any certain arrangement. The quartz and felſpar were *amorphous*. The ſides and angles of this cryſtal were well *defined*, but no two of the ſides were parallel.

A very regular cryſtal, from the Cahnawaga ridge, in the form of a rhomboidal priſm, appeared to be compoſed of quartz, felſpar, mica and hornblend; all which particles are amorphous.

Here, then, are cryſtals formed by the aggregation of the moſt diſcordant forms. Why then ſhould we admit the bold conjecture of all the particles of any cryſtal being ſimilar in form? I have examined, with a microſcope, the fractures of coarſe grained cryſtallized baſaltes, but could diſcover nothing in them like regular formed *particles*; and yet the aggregation was of a regular form. I ſhall here ſay nothing of the difficulty of ſuppoſing, that ſubſtances, whoſe ultimate particles, even according to de Hauy's theory, muſt be ſo different as thoſe of ſilex, magneſia, argill, and iron, ſhould unite into regular figures by the neceſſary union of their ſides.

Theſe are a few of the facts which have induced me to differ from Mr. de Hauy. It would be of but little conſequence to prove his theory falſe, if it ſtood perfectly inſulated, as at firſt view it would appear to do, from all other parts of ſcience. But this never can be the caſe with any propoſition. There is none, however abſtract or inſulated it may at firſt appear, but, at ſome time or other, becomes connected with ſome parts of ſcience, and, according to its truth or falſehood, is uſeful or detrimental. Attempts have been made to explain the whole doctrine of affinities from theſe ſuppoſed forms of the ultimate particles. Sulphuric acid and the vegetable alkali have a ſtronger affinity for each other than nitrous acid and vegetable alkali have, becauſe their ultimate particles are of ſuch forms as to preſent larger ſurfaces to each other: nay, they have even carried hypotheſis ſo far as to propoſe to calculate the ratios of affinity by the ſuppoſed relative ſurfaces the ultimate particles of different ſurfaces preſent to each other. How careful, then, ſhould we be in admitting any hypotheſis, however unimportant it may at firſt view appear, without the ſtricteſt examination! The arguments of Mr. de Hauy, in ſupport of his theory of cryſtallization, from which ſuch im-

portant deductions are attempted to be drawn, appear to me to prove nothing more than that, if he had cryſtals to conſtruct, that is the way he would chooſe to make them.

I remain, Gentlemen,
With eſteem, yours, &c.
THOMAS P. SMITH.

Philadelphia, Auguſt 16, 1799.

ARTICLE VII.

SEPTIC (Nitric) ACID *the Cauſe of the Mortality among the Neat Cattle and Horſes of Canada, during their Stabling in Winter: In a Letter from Mr.* BLANCHET *to Dr.* FISHER, *Surgeon of the Garriſon of Quebec, and Member of the Houſe of Aſſembly in Lower-Canada, dated Eſſex County, (N. J.) July* 30, 1799.

SIR,

AS we cannot extend too far the ſphere of our ideas upon ſubjects of utility, and as it may always be of public advantage to apply principles which we know, to the explanation of natural phenomena, for the purpoſe of mitigating or preventing the evils which afflict us, I have determined to offer you the reſult of my reflections on that mortal peſtilence which rages among our cattle in Canada during the winter, and cauſes a great deal of loſs and diſtreſs among many of our reſpectable inhabitants on the approach of ſpring.

Every body knows that few winters paſs wherein a number of our farmers do not loſe, before the termination of the ſpring, more or leſs of their live ſtock. There are even ſome families who have been entirely ruined in this way; and others who have loſt, in the courſe of one winter, their whole herd of cattle.

Superſtition and conjecture have been vainly employed in ſeeking remedies for ſuch ſerious calamities. Far from inveſtigating the cauſe of theſe afflicting accidents, in the places where they aroſe, it has been cuſtomary with the people to aſcribe them to the ridiculous or impoſſible workings of ſorcery and witchcraft. Very different, indeed, Sir, from this

are the regularity and ſimplicity of nature. Such wanderings of the underſtanding will never be able to afford a remedy againſt theſe diſaſters.

The cauſe of the epizootic diſtemper to which I allude, that happens during the wintering of our cattle, will appear plain from a conſideration of the following circumſtances:—The people of Lower-Canada, expoſed to a long and rigorous winter, are obliged to erect ſtables, to guard againſt the inclemency of their frozen climate. With the view either of ſaving trouble or expenſe, they generally leave their ſtables without pavements. This neglect has led on to another of a more ſerious kind: for they have been thereby induced to neglect the removal of the dung and other excrements of the beaſts from the ſtable, during the whole winter. This collection of excrementitious matter forms, before ſpring is ended, a bed one foot and a half, or two feet in thickneſs. A ſtable of this ſort has commonly no other opening than the door, which is always kept ſhut during the night, and very commonly alſo during the day. Here, in ſhort, is every thing neceſſary to engender the moſt virulent peſtilence, of a malignity ſufficient to deſtroy the whole flock in a ſhort time.

For this dung-heap has no ſooner acquired a certain thickneſs, than, under the moiſtening effect of the urine, the maſs neceſſarily heats, and undergoes gradual decompoſition. But as *ſepton* (azote) and *phoſphorus* are the principal active ingredients in this mixture of materials, it is preſumeable, that carbonic, *ſeptic*, and *phoſphoric* acids, are the moſt copious of the new products. I have, indeed, myſelf ſeen, in the different layers of theſe dung-heaps, depoſitions of the ſeptite of pot-aſh or nitre.

Independent of this, it is remarked that horned cattle, tied at the further end of a ſtable, are more ſeverely affected by the poiſon than thoſe which are faſtened near the door. And it has likewiſe been obſerved, that on bringing the creatures from the remote part of the ſtable, which were generally the moſt lean, and giving them a ſtand near the door, they have quickly recruited, and become more lively.

I am of opinion too, Sir, that the diſtemper known among our horſes in the winter time, under the name of *torticoli*, or *ſtaggers*, proceeds from the operation of a *ſimilar poiſon*. For if care is not taken to change the ſtable, or place where the horſe is kept, he dies; and if he is removed to a more clean and wholeſome ſtable, he almoſt always recovers. The

diſeaſe in their heels, called the *ſcratches*, evidently ariſes from the operation of the ſeptic acid of the dung in which their feet are bemired. From this it is natural to ſuppoſe that the polluted and infected air to which theſe animals are expoſed, at leaſt five or ſix months of the year, would affect their growth, and have a tendency to diminiſh the breed. This cauſe, which has eſcaped the notice of naturaliſts, is deſerving of conſideration; for it does not appear probable to me, that *cold and moiſture*, as the Count de Buffon and M. de Pauw have obſerved, are the cauſe of the degeneration of our neat cattle and horſes in Canada; but it ſeems evident that the diminution of their ſize is partly to be aſcribed to the manner in which they are wintered. It has been obſerved, too, that oxen and cows fat better when kept on a pavement than in the mire of their own excrements.

Thus, you ſee, every thing concurs to prove that epizootic diſtempers in Canada, ſuch as I have deſcribed among our neat cattle and horſes, are produced by vapours of the ſeptic (nitric) acid, which are engendered and extricated during the putrefaction of the dung, and other filthy ſubſtances collected in the ſtables. You will remark, however, that the explanation now given does not include the mortality among domeſtic animals, from a want of food, which, when it befals them, as well as the human ſpecies, is referable to quite a different cauſe, as I hope, at ſome future time, to ſtate to you.

From what has been ſtated concerning the diſtemper of animals in Canada, I feel myſelf inclined to offer a reflection or two on the miſeries and calamities ſuffered by the ancient inhabitants of Egypt. It may, perhaps, be poſſible to reconcile to phyſical cauſes certain miracles related by the ſacred hiſtorian, if human underſtanding might be permitted to fathom their depth. Among the plagues of that region, mentioned in Geneſis, it is eaſy to comprehend how, by means of the *ſeptic* (nitric) *acid*, which has always been conſiderably prevalent in that portion of atmoſphere, the *mortality among their animals* was brought about, as well as the *ſores* which afflicted both man and beaſt, and the *viſitation by hail*. There is ſuch a connection between theſe phenomena, as has been obſerved, even in our own times, during the volcanic eruption in Iceland, deſcribed by Mr. Holm,* that one could readily give up the miracles to the dominion of nature alone,

* See Mitchill's Theory of Hail, Med. Repoſ. vol. iii. p. 81 & ſeq.

if there was not aſſurance of their being derived from a higher authority.

Be theſe things as they may, it is certain the Egyptians have ſuffered, and ſuffer ſtill, certain plagues, which are inſeparable from their climate and local circumſtances. The annual overflowing of the river Nile, which is a ſource both of beauty and wealth to the country, depoſits on its banks a variety of ſubſtances ſuſceptible of putrefaction. Theſe being left by the water, which retires to its channel, are expoſed to the drying and ſcorching rays of the ſun, by which they are decompoſed, and converted, as far as their conſtituent particles permit, into ſeptic (nitric) acid. The quantity of nitre which is found there proves that its atmoſphere abounds, more or leſs, with this acid. Pliny mentions that nitre is found in this country. After having given an account of its natural production in Macedonia, he writes thus: "In Ægypto autem conficitur multo abundantius, ſed deterius, nam fuſcum lapidoſumque eſt; fit penè eodem modo quo ſal: niſi quod ſalinis mare infundunt, Nilum autem nitrariis." And although d'Anville, Sicard, and Volney, inform us that the nitre of Pliny is what is now-a-days called mineral alkali, or ſoda, there are, nevertheleſs, ſeveral ſubſtantial reaſons to convince me, that there is formed ſpontaneouſly, in Egypt as well as in India, a prodigious quantity of nitre, in the modern ſenſe of the word. It may hence be preſumed, that without the preſence of an alkali in the ſoil, to counterbalance the activity of the ſeptic acid engendered there, this beautiful country would, in ſome parts, be too unhealthy to live in.

But, as the quantity of ſeptic acid in the atmoſphere ought to vary according to circumſtances, the alkali, whether potaſh or ſoda, ought ſometimes to be too ſcanty to attract or abſorb the whole of its virulence: conſequently, the ſurpluſage of this deſtructive agent, in ſuch caſes, will act upon the ſurrounding objects—men, for example, and domeſtic animals ſometimes—and cauſe deſtroying plagues among them: for, if in the ſtables of Canada a ſimilar poiſon can cut off, in a ſhort time, a farmer's whole ſtock of creatures, what may we not ſuppoſe it capable of doing in a climate where peſtilential and ſeptic vapours are among its moſt plentiful productions? All the animals forced to live and breathe in ſuch an atmoſphere, may be expected either to be killed immediately, or be deſtroyed by ſlow degrees, when the poiſon is not ſufficient to extinguiſh their lives at once.

Yet, upon the ſuppoſition that the plagues of Egypt, as recorded in holy writ, are ſuſceptible of the explanation and interpretation herein attempted, how, it may be aſked, did the people of Iſrael, who dwelt in the land of Goſhen, eſcape? This queſtion may be anſwered by aſſigning the ſame reaſon by which we explain the almoſt entire immunity of the inhabitants of Syracuſe from the peſtilence that almoſt deſtroyed the Carthaginian and Roman armies, by which they were cloſely beſieged. The poſition of the town was more dry and elevated than its marſhy neighbourhood, where the armies of the beſiegers were encamped;* in like manner as the yellow fever has repeatedly ravaged the cities of New-York and Philadelphia, without attacking or infeſting the country places in their vicinity. In the ſame way the land of Goſhen may be conceived to have been ſheltered from the plague of Egypt, on account of its ſituation to the eaſt of the Nile, where the land is naturally both higher and drier. I do not, however, by any means, pretend to queſtion the correctneſs of Moſaic hiſtory. The ſtudy of nature is not likely to claſh with true theology.

Having thus ſhewn the analogy which exiſts between the peſtilence, during the wintering of cattle, in ſtables in Canada, and the plagues of Egypt, I ſhall next offer a few ſentiments on the means neceſſary to prevent the waſte of this diſmal diſtemper.

1. All ſtables, and other buildings for ſheltering theſe domeſtic animals during winter, ought to have paved floors; and, in order to neutralize the ſeptic acid, the pavement ſhould be of lime-ſtone, or ſome other *calcareous* material.

2. The proprietors ought to be careful in removing regularly the dung which is dropped; ſo that the ſtables may not abound with the ſubſtances whence ſeptic acid is formed.

3. To preſerve a proper ſyſtem of cleanlineſs; and, for more effectually accompliſhing this, to provide a ſufficient number of windows or openings, to let out foul vapours and to let in pure air.

4. To white-waſh, with lime, the inſide of the ſtables, two or three times during the winter, eſpecially during the months of March and April.

Experience has taught the inhabitants of Holland the neceſſity of guarding againſt peſtilential diſtempers among their cat-

* Rollin's Ancient Hiſtory, vol. i.

tle. Their ſtables are paved, and frequently cleanſed with water and ſoap. This latter ſubſtance being but a combination of oil with an alkali, is a proper material to neutralize the acid of putrefaction. Since Dr. Mitchill explained the manner in which ſoap neutralizes and deſtroys the putreſcent ſubſtances which are produced in the clothing and habitations of men, there can be no doubt of its efficacy in cleanſing cow-houſes and horſe-ſtables upon the ſame principles.

Such are the advantages we may now derive from chemiſtry; that ſcience which, though under-rated and miſunderſtood in its infancy, is faſt acquiring, in a more enlightened age, a proper degree of importance and influence. Guided by its illuminating torch, the human underſtanding diſcovers, with aſtoniſhment, the moſt hidden ſecrets of nature. And, in proportion as chemiſtry ſhall be cultivated, will it ſhed a luſtre over all the different branches of phyſical ſcience.

With great reſpect, &c.

F. BLANCHET.

ARTICLE VIII.

THEORY OF EXPLOSIONS.

An Induction of certain Facts, which tend to prove that the burſting of Veſſels containing Water, in freezing, is owing to the Extrication of Atmoſpherical Air; that the ſudden Expanſion of Air lodged in the Pores of Trees, by means of Lightning, is the Cauſe of the violent ſhivering of their Parts; and that Volcanic Exploſions and Earthquakes derive their Origin from the ſame Cauſe: Communicated in a Letter from Mr. BLANCHET *to Dr.* MITCHILL, *Profeſſor of Chemiſtry, Natural Hiſtory and Agriculture in Columbia College, in the State of New-York.*

THE cauſe of exploſions, in general, which, at firſt view, appears to be ſimple and eaſy to comprehend, is, nevertheleſs, beſet with many difficulties; and it is with much reluctance that I have ventured to diſcuſs this ſubject.

In order to avoid a tireſome recital, I ſhall decline to ſtate the opinions of philoſophers upon this ſubject. My deſign is to explain the immediate cauſe of certain phenomena, which ſeem hitherto to have eluded their reſearch. The phenomena which ſeem to be exceptions from general principles, becauſe they are preſented under an irregular and peculiar form, are included in the following queſtions:—What is the immediate cauſe of the burſting of veſſels containing water in the ſtate of congelation? In what manner does lightning rend and ſhiver a tree into ſo many pieces? Whence ariſe volcanic exploſions and earthquakes? Theſe inquiries form the ſubject of my letter.

As to the immediate cauſe of the burſting of veſſels filled with congealing water, the celebrated Dr. Black, according to the obſervation of Dr. Dickſon (ſee Medical Repoſitory, vol. iii. p. 35), ſeems, in ſome degree, to have underſtood it, when he ſuppoſes, "that in the moment of the converſion of water into ice, the latent heat of the water, then ſet at liberty, enters into the air which is contiguous to its ſurface, or combined with the water, and dilates it with ſuch force that it produces a ſeparation of the ice into an irregular form, and a burſting of the containing and reſiſting veſſels." But this explanation, however ingenious, is not entirely ſatisfactory. Beſides the caloric extricated from freezing water, which may dilate the air combined with it, there is another agent which eſcaped Dr. Black's attention; that is, the ſudden detachment of atmoſpheric air which is found lodged in the interſtices of the particles of the water.

The moſt ſimple principles of natural knowledge teach us that atmoſpheric air cannot paſs from its permanently aëriform ſtate to that of fluid or ſolid, by any degree of cold with which we are acquainted. Admitting this to be true, there is no longer any ground of ſurprize in ſeeing the burſting of bodies which reſiſt the force of freezing water. The air, a fluid of permanent elaſticity, being compreſſed, and forced to give way to the particles of water, which cold, or the attractive power of the atoms of bodies, draws violently together, it follows that the ice, into which the water is converted, muſt break aſunder, in order to afford a paſſage to this aëriform ſubſtance, which cold can neither condenſe nor make ſolid, and muſt rend and ſhiver, with a cracking noiſe, the veſſels no longer able to hold it.

This theory is rendered probable, and ſtrengthened, by a

fact which I have obſerved myſelf, viz. that the fats, ſuch as hog's fat, &c. ſettle conſiderably down in the veſſels in which they are condenſed. I have alſo noticed cavities in the interior parts of ſuch maſſes of fat. Now, this ſhrinking of volume, and theſe cavities in fat, undoubtedly, can only ariſe from the extrication of atmoſpheric air in the proceſs of condenſation. Independently of this fact, which every body is ready to atteſt, there is not a Canadian peaſant who is ignorant that the cavities found in a maſs of ice were formed by air, and contain it. Theſe facts, therefore, prove that, in the congelation of water, the atmoſpheric air which exiſts in the interſtices of the particles of water is forced to detach, or ſet itſelf at liberty, as ſoon as cold converts them into ice.

On this principle it is eaſy to explain the rending and ſplitting of trees, with a cracking noiſe, during the froſts of winter—the burſting of ſtones in the moment of the converſion of the water contained in them into ice—and the breaking, as well as the loſs of the primitive perpendicularity of walls which had been built during the autumnal ſeaſon.

According to the Academy *Del Cimento*, it appears to be demonſtratively true, that frozen water occupies more bulk than fluid water. This opinion ſeems to claſh with all fact and analogy: for we conſider it as aſcertained, that the ſpecific gravity of ice is greater than that of water—that is to ſay, that a cubic foot of frozen water contains more watery particles than a cubic foot of fluid water, ſince, in the former caſe, the particles are undeniably more cloſely approximated and compreſſed than in the latter. Now, is it poſſible that frozen water, whoſe particles have been condenſed, occupies more ſpace than water in the ſtate of fluidity? I have often ſeen water freezing in open veſſels, ſuch as the copper veſſels of kitchens, &c. and I have always remarked, towards the middle of the veſſel, a riſing, divided by chinks, which, doubtleſs, had been formed by the eſcape of atmoſpheric air, during the congelation of the water. It is this phenomenon which has probably led to a wrong concluſion. Beſides, the hog's fat, which, like water, becomes ſolid by cold, or by the abſence of caloric, is diminiſhed in bulk by condenſation; and, if the air which eſcapes in this proceſs produce no burſting, it is becauſe the fat is always ſet to cool in open veſſels. Upon what ground, then, could an exception be made to the general law? But I now come to explain the effect produced by lightning, when it ſtrikes a tree, &c.

No perſon, ſo far as I know, ſeems yet to have accounted for the ſhattering of trees by the ſtroke of lightning. A moment's reflection, however, ſuffices to diſcover and explain the cauſe. As it is only by a careful analyſis of facts that we can deduce juſt concluſions, I proceed to examine what happens in the moment of the lightning ſtriking a tree, and it will be ſeen whether this ladder will enable us to reach to the cauſe of this phenomenon.

Since the beautiful experiments of Lavoiſier, of Fourcroy, &c. have demonſtrated that caloric is the cauſe of the repulſive power of the atoms of bodies, there is no doubt that the more the atoms of a body are removed from one another, the greater is the capacity of ſuch a body to contain caloric, or the more caloric it contains. It is alſo inconteſtibly proved, that the bodies which are conſtantly in the ſtate of gas, in the common temperature of the atmoſphere, contain a great quantity of caloric, and in proportion to their ſpecific capacity for holding it. So likewiſe the electric fluid, or what might, with more propriety, be called the electric gas, muſt contain a prodigious quantity of caloric, ſince this element always exiſts in the ſtate of gas, and the more this gas is accumulated, the more the amount of ſpecific heat muſt alſo be augmented.

This being premiſed, whenever the lightning (which is only an accumulation of electric gas, diſcharged from one cloud to paſs to another containing a leſs quantity) happens, in its courſe, to ſtrike a tree, &c. the tree becomes ſo ſuddenly overcharged with caloric, that the air and other conſtituent parts of it, which are diſpoſed rapidly to combine with heat, undergo expanſion, and thereby ſhiver the tree, in order to force a paſſage, and to ſet themſelves at liberty. I cannot compare this phenomenon to any thing better than to the diſcharge of a cannon or of a muſket; for every body knows that the diſcharge of a cannon is owing to the ſudden expanſion of the conſtituent parts of the powder by the introduction of caloric.

In like manner, I have every reaſon to believe that the violent rending of a tree, by lightning or the electric gas, is owing to a ſimilar cauſe, that is, a ſudden accumulation of caloric, which expands, with violence, the air, &c. lodged in the interſtices of that body. This opinion will be readily embraced, if it be conſidered that the electric gas melts the metals. If, indeed, the metals be ſuddenly melted by this gas, or rather by the caloric which it contains, is it not thereby de-

monſtrated that ſuch a degree of heat is ſufficient immediately to ſet fire to all combuſtible* bodies, and ſo far to expand the air contained in the tree as to cauſe the rending of its parts?

If animals which are killed by a ſtroke of lightning, or by the accumulation of the electric gas, receive no apparent injury, ſuch as laceration of their parts, as in the caſe of the tree, their death muſt be owing to a decompoſition produced in their bodies. This opinion, which has never been attended to, ſhall be fully developed and diſcuſſed in another work. I proceed, therefore, to the third part of my ſubject; to wit, to inquire concerning the immediate cauſe of the eruption of volcanoes and of earthquakes.

Whatever may be the agent which kindles and inflames volcanic ſubſtances, whether it be the electric gas which communicates its fire to thoſe moſt inflammable ſubſtances, ſuch as ſulphur, &c. or whether it be the ſubterranean heat, which, in making its eſcape, ſets fire to thoſe ſubſtances—ſtill it is certain that atmoſpheric air muſt be found in great quantities in the interior of volcanoes. For ſince the ever memorable diſcoveries of Lavoiſier, of Prieſtley, of Scheele, and of Ingenhouſz, on combuſtion, it is admitted as a demonſtrable truth, that the burning of combuſtible ſubſtances is owing to oxygen, that is to ſay, it is fixed and abſorbed by the body in combuſtion, while the caloric and the light which are combined with it, eſcape in order to form the flame, the light and the heat. In this manner atmoſpheric air is one of the eſſential agents in ſupporting the fire of a volcano.

Theſe things being premiſed, as ſoon as a volcano is kindled and ſet on fire, the atmoſpheric air which feeds it, as well as the baſes of ſulphur, of water, &c. which are alſo converted to the ſtate of gaſes, by the evolution or accumulation of heat, are expanded, and break out with a violence and impetuoſity not to be reſtrained by the force of oppoſing bodies, and thereby give birth to earthquakes, &c.

This theory is remarkably countenanced by the common and uniform ſeries of occurrences which follows the eruption of a volcano. In the firſt place, as ſoon as it is kindled, there appears a thick ſmoke; ſoon after, when the air, &c. become expanded, ſtones of enormous bulk are thrown out to great

* The experiment of Meſſrs. Lavoiſier and Meunier, in which they cauſed an electric ſpark to paſs through a balloon which contained oxygen and hydrogen, to produce combuſtion in order to form water, proves how large a quantity of caloric is contained in the electric gas.

diſtances into the aërial regions, accompanied with earthquake, and agitation of all the ſurrounding country. As ſoon as the ſuperfluous air is diſcharged and ſet free, there ſucceeds a bright flame, which ſeems to reſtore ſerenity to the abyſs, which again, after a ſhort time, vomits forth a ſhower of fiery and deſtructive matters.

To recapitulate—1. The burſting of veſſels in the freezing of water is owing to the eſcape of atmoſpherical air, which alſo ſeparates the ice into irregular maſſes. Nothing is more improbable than the expanſion or increaſed repellency of the particles of water in the proceſs of congelation. This gives an anſwer to the queſtion of Dr. Dickſon (ſee Med. Repoſ. vol. iii. p. 34). 2. The ſhivering of a tree by lightning is cauſed by heat expanding the air, &c. which it contains. 3. The eruption of volcanoes and earthquakes is likewiſe produced by expanſion of air. In a word, every exploſion is owing to the ſudden extrication of ſome matter incapable of confinement, or to the expanſion of air in a reſiſting body.

I am, with much eſteem and conſideration,

Sir,

Your moſt humble ſervant,

F. BLANCHET.

Eſſex County (N. J.), Aug. 15, 1799.

ARTICLE IX.

Brief Remarks on the Origin of the Yellow Fever in ſome Parts of the State of Rhode-Iſland, drawn up by MOSES BROWN, *Eſq. of Providence.*

THERE are ſome reaſons to apprehend that the Briſtol fever of 1797, though confidently ſaid, by ſome, to have been imported, was generated there; or, if brought in the ſhip Waſhington, was generated on board. I have taken ſome pains to inveſtigate it, have examined the log-book and journal, and converſed with the keeper, a reſpectable young man on board during the voyage. The ſhip Waſhington, William Snell, maſter, ſailed from Briſtol to Savannah, in Georgia; from thence ſhe ſailed, on the 19th of 7th month

(July), for New-York, where ſhe arrived on the 9th of 8th month (Auguſt), after 21 days paſſage, with a cargo of rice and tobacco. She was viſited by Dr. Bayley, the Health-Officer; ſailed on the 13th for Briſtol, and arrived on the 15th; had been ſo leaky during her paſſage from Georgia as to require 200 ſtrokes of the pump every hour to free her. The crew ſay the yellow fever was not, as they heard of, there during the time of the ſhip lying at Savannah. The captain and mate took the fever and ague before they came out, and brought it home with them. A young man who ran away from a New-York ſhip (the Elizabeth), which had no perſon ſick on board, took refuge in the Waſhington, and ſhe being in want of hands encouraged him to ſtay. He was ſecreted in one of her ſtate-room lockers a number of hours, and came out, ſweating profuſely, in the evening: he took cold by lying on deck the night he began to complain, and died the 5th of 8th month (Auguſt) ſeventeen days after ſailing. Another of the hands was ſick when they got to New-York, and was taken to the Hoſpital, by the advice of Dr. Bayley, as having eryſipelas. He died about thirteen days after. Another was taken, labouring in the hold, on the 13th, in unloading at Hellgate. He came to Warren, and died in his father's family on the 20th. Another young man (Bradford) was taken ill, labouring in Briſtol harbour to get the ſhip off the ground, and lay ſick at his father's houſe, a mile out of town, but recovered. None of theſe two families, nor any other perſon, took the fever; nor was it communicated from the waſhing of the clothes of any of the people who came home. Hence it would ſeem, if theſe had the yellow fever, it was not contagious, either from them or their clothes. It was ſaid to have been taken from ſome light ſails which the ſail-maker took from the veſſel. The crew ſay theſe ſails were daily hoiſted, were wet and dried again, after the ſhip left New-York. It ſeems unlikely that theſe ſails (never, as they ſay, lain on by the ſick) ſhould communicate the diſeaſe, while the very clothes and bodies of the ſick who came home in her did not, though attended by all their friends, without fear or ſuſpicion of contagion. It was alſo ſuggeſted that the ſhip's bilge-water gave the neighbours the fever; but her leaking muſt have prevented much collection of filth; and thoſe who ſaw her pumped told me the water was white, like ſea-water, ſhe leaked ſo much: and though the ſubject is too lengthy for diſcuſſion here, I add, there are ſome of the moſt judicious people in that town

conſider the fever (of which eighteen died and one recovered) to have originated in Briſtol, while others ſay it was imported in the ſhip above-mentioned: ſo nothing can be abſolutely determined by the opinions there, further than as to its contagiouſneſs, if thoſe I mention had it, whoſe families had it not.

Of the firſt nine who died in Briſtol, there were none communicated it to any others; but the perſon who recovered is ſaid to have given it to a native, or very long reſident black woman, who watched with him. She, however, had it, and died; by which many conſidered it to have been contagious: yet ſhe might have taken it from the ſame ſource as others there did; for the next women who had it, and who died on the 1ſt of 10th month (October), is ſaid to have been no where to take it. Many were on board this ſhip at Briſtol, and unloaded her, but have not had the yellow fever. Two that worked on board have had a bilious fever ſimilar to that of the young man, my informant, and recovered, though only one out of eighteen who had the yellow fever in town ſurvived; by which it appears that the fever taken by fatigue on board was much more favourable than that of the people in town, who could give no account how or where they got it, which ſhews a bad ſtate of the air, and is thus accounted for:—They raiſe large quantities of vegetable roots, as onions, beets, parſnips, &c. and collect large heaps of manure. In that year, near where the fever commenced, there was a large and very offenſive pile of putrid fiſh and other matters heaped up to rot for manure; and an offenſive old diſtillery, that had not been wrought for a number of years, at the ſame wharf where the ſhip lay; from whence, it is probable, the ſmell proceeded that was attributed to the bilge-water, which, as the ſhip, though light, leaked much, could not ſmell ſo offenſively.

The mortality in this town, for the years 1795, 1796, and 1797, ought to excite the inhabitants to more attention in inveſtigating the cauſe, and, if poſſible, to remove it: for its natural ſituation one would ſuppoſe to be as healthy as that of any town in the State.

I find, by a liſt of individuals, kept by a perſon of obſervation there, Daniel Bradford, Eſq. whoſe ſon was my informant before mentioned, and whoſe journal I examined at his father's houſe, that forty-eight perſons died in 1795, ſixty-three in 1796; and from the 7th of 1ſt month (January) to the 27th

of 10th month (October), inclusive, being only nine months and twenty days, fifty-five persons died there, of whom ten were males, from thirteen to seventy-three years of age, and eight females, from thirteen to forty-seven, in the year 1797. This year, 1798, I believe it has been healthy there as well as at Providence. [*Further extracts from Mr. Brown's account of the Yellow Fever will appear in some of our future numbers.*]

REVIEW.

ART. I. *A New Nomenclature of Chemiſtry, propoſed by Meſſrs.* De Morveaux, Lavoiſier, Berthollet *and* Fourcroy. *with Additions and Improvements. By* Lyman Spalding, *M. B. Lecturer in Chemiſtry in Dartmouth Univerſity. Hanover (N. H.)* Davis. 1799. 4to. *In a Series of Tables.*

FEW publications give us more pleaſure than thoſe which indicate the ſpread of ſcience among the American people. We find, by the piece before us, that a taſte for chemical inquiry has manifeſted itſelf in Dartmouth College, and that the enterprizing Lecturer, whoſe appointment we announced in our vol. ii. p. 337, has undertaken to facilitate the acquirement of that kind of knowledge, by editing a Nomenclature for the uſe of the ſtudents.

Dr. Spalding modeſtly ſtates his motive for venturing upon this publication; that, being impreſſed with a ſenſe of the importance of chemical ſcience, as well as of the difficulty in learning it, ariſing from the introduction of a new language, and from a multiplicity of ſynonymous terms, he had been prevailed upon ſo far to amend the Nomenclature propoſed by the French philoſophers in 1787, as to adapt it to the *preſent* ſtate of things.

On inſpecting the liſt of ſimple or elementary ſubſtances, we find the number conſiderably reduced. This reduction chiefly ariſes from the perſuaſion the author felt, that many of the *vegetable*, and ſome of the *animal* acids, poſſeſſed not *ſimple* but *compound* radicals of carbon and hydrogen; and that ſome others, particularly thoſe of animal derivation, as the pruſſic, bombic, formic, ſebacic, and lithic, contained ſepton or phoſphorus, or both, in addition to the carbonic and hydrogenous matter of their baſes. He has, accordingly, removed theſe unknown and ſuppoſed ſimple radicals, to thoſe parts of the nomenclatural arrangement in which, as far as in the preſent ſtate of knowledge and probability can be eſtimated, they ought to be placed. And, in the execution of this, we generally agree with him.

In other reſpects the diſpoſition of the articles is very much as in the original plan; even to the retention of ammoniac in the catalogue of elements, notwithſtanding its having been ſince ſhewn to be a compound of ſeveral. It ſtrikes us, however, there are ſome elementary bodies omitted which it had been better to have retained. Why, for inſtance, if Dr. S. did not think it worth the while to inſert *auſtrala* and *adamantine* as primitive earths, did he neglect to inſert ſo incontrovertibly a diſtinct ſpecies as *alumine* or clay? Though he might have thought the metal *titanium* worthy a place with the fancied appellations of *ſiderite*, *ſaturnite*, and *menackanite*, which have been impoſed on the public, yet wherefore has he omitted *chrome* among the real metals?

Among the amendments, we obſerve, that, purſuant to Profeſſor Mitchill's propoſal, ſepton and its derivatives are ſubſtituted throughout for azote, azotic, nitrous and nitric. It gives us pleaſure to find that ſo material an improvement in the Nomenclature is ſo cordially adopted, and ſo generally coming into uſe. It is excellently calculated to introduce truth to the mind.

It is a pity that the fallacious term *hydrogen* had not been expunged, and the well known word *phlogiſton* received in its place. Hydrogen is interpreted to be the baſis of water. True; but is it not alſo the baſis of every thing which burns with *blaze*, or exhibits *flame?* Oil, alkohol, ether, reſin, wax, tar, coal, wood, and many other ſubſtances, when they undergo combuſtion in the open air, are *blazing* or *flaming* bodies. Water may be made to undergo combuſtion, or to burn with flame alſo. In framing a philoſophical language, it is neceſſary to give to each thing a name which ſhall be at once *comprehenſive* and *preciſe*. Phlogiſton happily expreſſes, at once, the character in which water and inflammable bodies generally agree, and the particular phenomenon of *flame* or *blaze*, whereby they differ from all others. *Phlogiſton*, thus, will mean that claſs of the particles of matter which *blaze* or *inflame*; *phlogiſtous air*, or the air which burns with blaze, will be the new name of hydrogenous gas; and oxyd of phlogiſton the term for water. For more particulars of this, ſee our Repoſitory, vol. i. p. 515. vol. ii. p. 53. and Nicholſon's Journal of Natural Philoſophy, &c. for February, 1798.—We are firmly perſuaded this amendment would have a very conciliatory and pacific effect in the chemical world.

In all the Nomenclatures we have peruſed, the article of

light appears to have been very imperfectly ſtated. It appears to us that light reſembles oxygen, phlogiſton and ſepton, in one reſpect; that is, it is never capable of being obtained in a diſtinct form. It is proper, however, to give a name to the ſubſtance in the abſtract. In the common form that light is preſented to us, it is a gas, or a ſolid diſſolved in caloric. On the decompoſition of this *luminous gas*, its *latent* caloric is let looſe in a *ſenſible* form. A multitude of phenomena depend upon this conſtitution of fluid or ordinary light, from its ſolution in caloric, which are well worthy of Count Rumford's attention. It will be found that the laws governing the compoſition and decompoſition of that wonderful fluid the ſun-beam, muſt be inveſtigated, in order to unfold to us the true doctrine of light and heat in this planet and in the univerſe.

This fluid light has an attraction for oxygen, and diſſolves a portion of it with extreme readineſs. This compound is the *gaſeous oxyd of light*, or common dephlogiſticated or oxygenous air. It is utterly a miſtake of the framers of the Nomenclature, and all their followers, to aſſure their readers that vital air conſiſts merely of caloric and oxygen. If this was the caſe, oxygenous gas ought itſelf to be an acid, and ſhould be incapable of exhibiting light on its decompoſition. But oxygenous air is ſo far neutralized by light *as not to be ſour*, and thereby is enabled, on its decompoſition, to give out *the luminous fluid by itſelf*.

We believe it is highly probable that ſome modification of *oxydated light*, when fixed in certain fæculæ or grounds, is the baſis of *permanent colours*, as Dr. Bancroft ſeems firſt to have ſuggeſted. We know of no inſtance of oxygen being diſſolved in luminous gas beyond the degree of oxyd. At this point their union ceaſes, by which wonderful proviſion fluid light is prevented from turning, in all caſes, to an acid, and the ſuperfluous oxygen is diſcharged to form new aſſociations. We may, therefore, be conſidered as being acquainted with light in the four following forms: 1. Pure or elementary. 2. Fluid, by ſolution in caloric. 3. Gaſeous oxyd of light, or oxygenous air: and, 4. Fixed oxyd of light, or baſis of permanent colours. We hope this excellent example of Dr. S. will be followed in all the colleges of the United States.

ART. II. *Notes on Husbandry and Rural Affairs. By* J. B. Bordley. *Philadelphia.* Dobson. 1799. 8vo. pp. 591.

WORKS on agriculture claim, from their very title, a considerable share of respect; since there is nothing more deserving of investigation, or, indeed, scarcely any thing which needs it more, than the cultivation of the earth. That farmer who improves the methods of tilling the ground, increases its produce, and abridges the labour and augments the comforts both of man and beast, is certainly entitled to high commendation. And when, in addition to this beneficial employment of his talents, he endeavours to make known his experience to others, and to diffuse and multiply knowledge, by publishing the results of his inquiries, he really seems to possess a still higher degree of merit. Facts relative to rural economy in America deserve eminently to be collected. Comparative experiments on the soil and productions of the different parts of the western continent are exceedingly wanted. So little has hitherto been published on American husbandry, and so imperfectly do we know what is most systematic and best to be done, that it has been a custom with those who sought information from books, to read the British publications, and to adapt the principles and practice of agriculturalists in that island to the various soils and climates of America. The inconvenience and injury which have arisen from an adoption, in this land, of modes recommended as successful in a region so widely different as Great-Britain, have led not a few of our farmers to a contempt of all "knowledge derived from books." This is a misfortune: and when it is considered that many of these farmers are chosen to represent the counties and towns in which they live, in the Legislature, it often becomes a subject of lamentation, with what inflexible zeal they oppose almost all attempts to improve the condition of agriculture, by incorporating societies, granting premiums, establishing agricultural and botanical gardens, and every thing of the kind. This spirit is to be corrected by availing ourselves of the modes of practice in agriculture which are found to be good in each particular situation, soil and climate, and thereby convincing those sturdy "*terræ filios*," that farming is something more than a mere empirical art, and that it is susceptible of great and various improvement.

But, though facts ſhould be collected with care and arranged with judgment, there is ſomething worthy the attention of every author as to the manner of preſenting his ſentiments to the public. We fear that ſome perſons have felt diſcouragement at the ſize of a ſolid octavo of ſix hundred pages, and that others, who were not intimidated by its bulk, may have forborne to peruſe it on account of the price. Books intended for general inſtruction ought to be as conciſe as a regard to perſpicuity will permit, and no dearer than the materials and labour employed in the manufacture require. Through inattention to theſe particulars, the extent of the good which many publications were calculated to produce, has often been very much circumſcribed.

As to the matter of Mr. Bordley's book, it is proper to apprize our readers that it is not a philoſophical inquiry into the conſtituent parts of ſoils, nor of the number and qualities of elementary earths, nor of the compoſition or decompoſition of manures, nor of the noxious mineral ingredients with which land is ſometimes impregnated. Exceedingly different is it from that elegant and compendious tract on natural and chemical principles by GYLLENBORG, for a verſion of which the Engliſh reader is indebted to Mr. MILLS; and it poſſeſſes very little reſemblance to the chemical and ſcientific reſearches of RUCKERT, DUNDONALD and KIRWAN.

Mr. B. who was an American farmer, has, on the other hand, offered to his fellow-citizens a *practical* performance, comprehended in thirty-two chapters, which may be conſidered as ſo many diſtinct eſſays on various branches of huſbandry. The principal of theſe are on rotations of graſs and grain, clover, beans, wheat, maize, hemp, potatoes, and rice, and on farm yards, barns, fences, cattle-ſtalls, country habitations, ice-houſes, diet in rural economy, and on yard-manure and gypſum. He treats alſo of the paſturing, ſoiling, keeping and fatting of cattle, and of the breeds of neat-kine, ſheep and hogs; as well as on the treading out of wheat as preferable to threſhing, on the purification of ſea-ſalt for family uſe, and ſeveral other ſubjects.

Among theſe eſſays, we obſerve the one *on gypſum* to be but an abſtract of the valuable publication of which we gave an account in our vol. i. p. 351 & ſeq. The *propoſal for a State Society of Agriculture* is a republication of what we remember to have ſeen, ſeveral years ago, in the form of a pamphlet. It was an application to the Legiſlature of Penn-

ſylvania, in 1794, to incorporate a ſociety for the promotion of agriculture; which, Mr. B. informs us, was rejected, and by "*huſbandmen* who were principally to be benefitted," (p. 450). The long chapter, entitled "Notes and Intimations," at the end of the book, and which amounts to conſiderably more than a fifth part of the whole, is made up of quotations and extracts from YOUNG, DOSSIE, TOOSEY, AMOS, MARSHALL, KIRBY, TWAMLEY, and others, interſperſed with obſervations by Mr. B. and facts collected by himſelf. He borrows alſo from the New-York Tranſactions, the Bath papers, and ſome other periodical publications.

Of that part of this volume which is more particularly the reſult of Mr. B.'s perſonal obſervation and experience, we think it juſt to remark, in general, that it appears to be the collected knowledge of a careful, candid, judicious and economical farmer, who, beſides the inſtruction derived from his own practical trials, had availed himſelf, by reading, of whatever was to be gained from the labours, ſucceſsful or otherwiſe, of others. We apprehend, however, the largeneſs of the capital neceſſary to purchaſe and conduct a farm according to Mr. B.'s directions, will be an inſuperable obſtacle to its adoption by both the poor and middling claſs of cultivators. The more wealthy alone can carry into effect his *deſign* for rotations of crops, and his *plan* for a farm-houſe and yard.

The twenty-firſt chapter, "on the Principles of Vegetation," is, we are inclined to think, the leaſt valuable in the volume; as the one which immediately follows it, "on Neceſſaries of Life as the beſt Products of Land and beſt Staple of Commerce," is, in our opinion, the moſt ſo to a political economiſt. The preferableneſs of cultivating *bread-corn* inſtead of *wine* and *ſilk*, is ſtrikingly pointed out, in relation to the happineſs of the cultivators, and to the public weal. The eſſay (p. 318) on "purifying Salt" for domeſtic uſe, is an excellent piece of advice to heads of families. It is well known that different kinds of ſalt poſſeſs very different qualities, ſome being far better to preſerve meat and butter from putrefaction than others. This inferiority of antiſeptic power muſt be owing to the admixture of foreign ſubſtances with the genuine muriate of ſoda. And the method of waſhing away the noxious *bittern* and *ſlack*, with which many ſorts of it are commonly adulterated, is eaſy, well-deviſed, and likely to do good. The obſervations "on Fences," tending to enforce the neceſſity of planting hedges, as timber for poſts

and rails grows ſcarce, are very proper and ſeaſonable; though Mr. B. does not appear to know that the hawthorn is one of thoſe plants whoſe ſeeds do not ſprout before the ſecond year after they are planted, (p. 239). We recommend to him Mr. HAVENS's experiments, publiſhed in part iii. of the Tranſactions of the Agricultural Society of New-York, and mentioned in our Review, vol. ii. p. 316.

The receipts for a number of wholeſome, palatable and cheap diſhes in rural economy are very important; and to thoſe who cannot have acceſs to the original publications whence they are taken, they muſt be deemed a uſeful collection. For the principles of cookery, as applied to cheapen living and improve diet, we refer the reader to RUMFORD's Eſſays. It is comfortable intelligence that ſeven hungry men can be furniſhed with a good dinner for four cents a-piece! (p. 413). In the State-Priſon of New-York, the daily diet for the convicts, including a dinner made of beeves' heads, with potatoes and cabbage in ſoup, and an allowance of brown bread, does not exceed ſix cents for a man. The bad and waſteful cookery throughout the land is a doleful drawback upon agricultural profit, and loudly calls for a reform; and the more ſo, as, we believe, in the preſent ſtate of ſociety, none are more ſqueamiſh with regard to their food than the poorer order of houſe-keepers, and hired labouring people in the country.

Mr. B.'s remarks on timothy, clover and wheat, on cattle, ſheep, hemp and maize, are, generally, ſo ſenſible and proper, that we prefer a reference to the chapters on thoſe articles ſeverally, rather than an abridgement of them here. After this copious diſplay, our readers will, we hope, excuſe us from enlarging any further on a work, concerning which we have ſaid enough for the information of thoſe who are deſirous of general knowledge only, and for ſtimulating the curioſity of ſuch as may be deſirous of a more minute acquaintance with the book itſelf.

ART. III. *A Brief Hiſtory of Epidemic and Peſtilential Diſeaſes; with the principal Phenomena of the Phyſical World, which precede and accompany them, and Obſervations deduced from the Facts ſtated. In two Volumes. By* Noah Webſter. *Hartford.* Hudſon *and* Goodwin. 1799. 8vo. pp. 700.

THIS work, whoſe commencement and progreſs we have repeatedly announced, has been an object of great expectation. The publication of a number of letters, by the ſame author, towards the end of the year 1797, through the medium of the newſpapers, which contained ſome of the facts and principles more amply diſcuſſed in theſe volumes, and which were eſpecially occaſioned by the controverſy concerning the importation or domeſtic origin of the yellow fever, excited much attention wherever they were read. Soon after the date of thoſe letters the plan of this work was formed, and, ever ſince, the publication of it has been waited for with impatience. But, however high the expectations of thoſe who know the induſtry and zeal of the learned author, as well as the fertility of the ſubject, we ſhall venture to engage that they will be far exceeded by the peruſal of his performance. No labour has been ſpared to render it as worthy of the public patronage, and as uſeful as poſſible. The collection of facts, as well as the conſultation of authorities, is eminently great; and although a multitude of difficulties muſt have ariſen, in conducting the reſearch, from a deficiency of records and ſcantineſs of libraries, we are happy to find ſuch difficulties ſo ſucceſsfully overcome.

In our judgment Mr. Webſter has performed a great work. Whether we conſider the extent and novelty of the deſign, the diligence, acuteneſs, and erudition diſplayed in the inveſtigations, the ingeniouſneſs and ſagacity of the combinations, or the importance of the reſults; whether we conſider the revolution of opinions which it tends to effect, or the range of inquiries which it is adapted to awaken, we muſt pronounce him entitled to the praiſe of an inſtructive and original writer.

The comparative mildneſs and infrequency of peſtilential epidemics, in the more civilized parts of the world, in modern times, and the prevalence of the doctrine of the importation of contagion, had produced a degree of inattention amounting almoſt to forgetfulneſs of the principles which

uſually govern the courſe of ſuch diſeaſes. The recent experience of many parts of the United States, as well as that of more diſtant places, has ſerved to recall our attention to this momentous inquiry. And, after a re-conſideration of the whole ſubject, aided by all the light which the wiſdom and obſervation of a ſeries of ages could offer, our author, in the work before us, preſents the fruits of his laborious and perſevering reſearches.

To contemplate peſtilential diſeaſes with more advantage, and to compare and digeſt their phenomena, as they occur in diſtant countries and remote ages, Mr. W. aſſumes the ſtation of an hiſtorian, and cauſes to paſs before him, in review, a long ſeries of thoſe diſeaſes, with a train of occurrences in the phyſical world accompanying or preceding them, in order that they may mutually lend their aid in explaining and illuſtrating each other. It is aſtoniſhing to reflect that this is the firſt attempt to write a hiſtory of epidemic and peſtilential diſtempers. To compoſe ſuch a work in the beſt manner, it is neceſſary to collect, and to bring under proper points of view, the facts which lie diſperſed through innumerable volumes; to read the writers of each age and nation in the original; to enter into the ſpirit and circumſtances of the times when they wrote; to examine the ſtate of ſociety, the diet, clothing, habitations, cuſtoms, manners, &c. of the people, as well as to aſcertain the nature of the ſoil, the face of the country and the climate wherein they occur. A great deal of this has been accompliſhed by our author; but much of it can never be attempted from the want of materials, owing to the defects of hiſtorical records, to the ravages of time, or to the devaſtation of barbarians.

The leading object of this work is to prove that epidemic and peſtilential diſtempers originate from a deleterious agent or agents, operating through the medium of the atmoſphere, ſometimes locally, and ſometimes over the whole globe, diſappearing and returning at unequal periods. This is preciſely the *epidemic conſtitution* of Sydenham, of which the facts collected by Mr. W. exhibit a luminous and incontrovertible proof.

One of the moſt intereſting features of this hiſtory is the relation ſuppoſed to ſubſiſt between peſtilential epidemics and ſundry other phenomena of the phyſical world; ſuch as comets, volcanic eruptions, earthquakes, meteors, the extremes of heat and cold, exceſſive rains and drought, tempeſts, high

tides, inundations, unuſual numbers of inſects, failure of crops, famine, &c.

In the firſt ſection of theſe volumes Mr. W. treats of the diverſity of opinions reſpecting the cauſe and origin of peſtilence. He contraſts the opinions of the ancients, formed from perſonal and unbiaſſed obſervations, with thoſe of ſome modern writers, particularly Dr. Mead, who finds, in ſpecific contagion, imported from Egypt or Ethiopia, a cauſe powerful enough to kindle the plague, and to ravage whole continents.

In examining the opinions of the ancients, Mr. W. agrees with many reſpectable phyſicians, who aſcribe to Hippocrates a knowledge of thoſe epidemic conſtitutions of the air which engender peſtilence, and which they imagine his expreſſion τὸ Θεῖον to ſignify. We doubt whether this concluſion reſts upon a ſolid foundation. Hippocrates, indeed, examines the effects of the air, whether cold, hot, dry, or moiſt—of the winds as blowing from different quarters—and of reſidence in different countries, and in different kinds of habitations. He treats alſo of the different ſeaſons of the year, of the ſolſtices, equinoxes, the riſing and ſetting of ſtars, and their reſpective influences upon the human body. He compares the ſeaſons with reſpect to health, and obſerves what diſeaſes are moſt incidental to each ſeaſon. But all this goes little beyond the obſervation of the ſenſible qualities of the air—whereas, to reach the point in queſtion, it is neceſſary to admit the operation of qualities of that fluid altogether inſenſible and occult. By τὸ Θεῖον Hippocrates ſeems to have intended to expreſs various things. On ſome occaſions he employs it to ſignify Deity, or the Supreme Firſt Cauſe; and on others, probably under the influence of ſuperſtitious or aſtrological impreſſions, he uſes it to denote ſomething myſterious, incomprehenſible or ſupernatural.* If this be applied to any agency

* Θεῖον Numen, Divina Natura dicitur, rerum humanarum præcipua cauſa et in rebus humanis principatum obtinens, apud Hipp. lib. Περὶ Γυναικ. Φυσ. (pag. 563. 26.) μάλιςα μεν το θεῖον τι τοῖσιν ἀνθρωποισιν αἴτιον εἶναι—maximé quidem divinam naturam in rebus humanis cauſam obtinere. Rurſus ibidem τὰ θεια (v. 33.) δει δὲ τὸν ὀρθῶς ταυτα χειριζοντα, πρωτον μεν ἐκ τῶν θείων ἀρχεσθαι—eum autem qui hæc recte tractare velit, primum quidem a Divina Natura initium ducere convenit. Τὸ θεῖον etiam quod eſt divinum ſignificat, quod a Deo eſt, aut quod eſt incomprehenſibile, ut Deus, et cujus cauſam ne ue ſenſu neque cogitatione aſſequi poſſis, quo modo accipitur initio lib. Περὶ Ἱερῆς Νουσου (pag. 301. 15. 40. 302. 14. 28. &c.) atque

in effecting morbid changes in the atmoſphere, whither does it lead us? Not, ſurely, to that preciſe, diſtinct and luminous fact of epidemic conſtitutions of air, unfolded by Sydenham, which our beſt hiſtories of diſeaſes, in all ages and countries, combine to verify. We are the more particular on this point, becauſe we think the praiſe of firſt clearly developing this proceſs of nature, in the production of epidemic diſeaſes, belongs, of right, to Sydenham. And though we meet with obſcure notices of it in many writers, from Hippocrates downwards to modern times, we are perſuaded it made little impreſſion on the minds of phyſicians, and effected few practical advantages, before the time of Sydenham.

In the ſubſequent ſections of the firſt volume, the author delivers an hiſtorical view of peſtilential epidemics, and the phenomena in the phyſical world, which accompany, precede, or follow them, from the earlieſt records to the Chriſtian era —from the Chriſtian era to the year 1347—from the year 1347 to 1500—from 1500 to 1600—from 1600 to the cloſe

alias ſæpe. Quo etiam ſenſu ει τι θειον ενεστι εν τησι νουσοισι ſumitur in quibuſdam in Progn. (pag. 118. 32. H. 36. 20.) Galenus verò poſt varias interpretum opiniones, illic τὸ θειον, την του περιεχοντος ἡμας ἀερος καταςασιν, exponit morborum populariter graſſantium generationem, quæ ex aëris conditione petitur intelligens, aut ſyderum cognitionem, quæ multum facit ad morborum prædictionem et totius anni conſtitutionem prænoſcendam. Cujus peritum eſſe medicum vult Hipp. libris Epid. et lib. Περι ἀερος, &c. Gorrh. cum Fernel. τὸ θειον intelligit aëris conſtitutionem, quæ magis proprietate totius ſubſtantiæ quam ſuis primis qualitatibus corpora noſtra offendat, quam νοσερην ἀποκρισιν vocat Hipp. lib. De Nat. Hum. (pag. 20. 22. H. 229. 2.) ἀναθυμιασιν, exhalationem ſive expirationem exponit Galen. Cujus quidem curationem optimo jure in loci mutatione et exiguo inſpirationis uſu ponit Hipp.

See Foeſius's Œconomia Hippocratis, p. 163, *included in the 2d vol. of the works of Hippocrates—Geneva edition of* 1657.

We ſee not upon what ground Galen refers to morbid conſtitutions of the air the paſſage above quoted from Hippocrates' book of Prognoſtics ἁμα δε και ει τι θειον ενεστιν εν τῆσι νουσοισι. As no quotation more pointed than this is mentioned (and we do not ourſelves remember one more ſo), it may be affirmed that Hippocrates has no where explicitly delivered the doctrine of epidemic conſtitutions, dependent on other than the ſenſible qualities of the atmoſphere. The expreſſions themſelves are ſo vague and indeterminate, the context ſo irrelevant, and the world, at that early age, was ſo overrun with ſuperſtition, that we believe thoſe words can never be ſatisfactorily interpreted. Beſides, it does not appear that Galen himſelf had any clear apprehenſion of this ſubject; and, therefore, he was totally unfit to detect, in the writings of Hippocrates, a latent doctrine, of which himſelf had no accurate conception.

of the year 1700—from the year 1701 to the year 1788—and from the year 1788 to the year 1799, including the laſt epidemic period.

It will be readily perceived, from the nature of this narrative, comprehending a great body of facts, drawn from a variety of ſources, with occaſional remarks on the facts ſtated, that it admits neither of analyſis nor abridgement. We feel, however, the leſs regret on this account, as we are perſuaded none of our readers will fail to peruſe the work itſelf.

The ſecond volume is introduced with bills of mortality for the two laſt centuries, with an account of the principal cotemporary phenomena of the elements. Theſe bills are for London, Augſburg, Dreſden, Boſton, one religious ſociety in Philadelphia, with a few of Paris and Dublin. After theſe the author delivers ſome general remarks on the preceding hiſtory, and the bills of mortality. And, as theſe remarks exhibit an outline of the hiſtorical facts, and of the principles deduced from them, and, at the ſame time, afford a ſpecimen of the author's ſtyle and manner, we lay them before our readers. (Sect. x. p. 10.)

"Imperfect as ancient hiſtory is, in regard to the accounts of diſeaſes, and the extraordinary phenomena of nature, we find, that between the year B. C. 480 and the Chriſtian era, a number of violent plagues occurred; moſt of which coincided in time with the following phenomena: comets, eruptions of volcanoes, earthquakes, drouth, ſevere winters, diſeaſes among cattle. Of thirteen comets mentioned in the foregoing hiſtory, which are all whoſe dates I am able to aſcertain, *eight* of them coincide with volcanic eruptions of Etna, the only volcano of any note which the hiſtory of that period has recorded; and *eleven* of them coincide in time with peſtilence. If we conſider the ſcarcity of our materials for a hiſtory of theſe phenomena, at that period, and make due allowances for the uncertainty of chronology, we ſhall find reaſon to be ſurpriſed at ſuch a number of theſe coincidences. In ſeveral inſtances we find extreme drouth, and very ſevere winters, to correſpond in time with comets and eruptions of Etna, conformable to facts in modern days.

"On this ſubject hiſtory is barren alſo for many centuries after the Chriſtian era. Yet in every period, even in the dark ages, we find numerous coincidences of the great phenomena above-mentioned. All the great plagues that have af-

flicted mankind, have been accompanied with violent agitations of the elements.*

"This obſervation reſts particularly on the events that preceded and attended the peſtilences of the following periods: A. D. 80—167—252—375—400—445—542—558—590—639—679—682—745—762—802—905—994—1005—1031—1044—1069—1106—1135—1142—1162—1181—1222—1242—1300—1347—1368—1400—1477—1500—1531—1577—1602—1625—1636—1665—1699—1709—1719—1728—1743—1751—1760—1770—1783—1789—Many facts, in other periods, concur to prove the truth of the remark.

"The phenomenon moſt generally and cloſely connected with peſtilence is an earthquake. From all the facts that I can find in hiſtory, I queſtion whether an inſtance of a conſiderable plague, in any country, can be mentioned, which has not been immediately preceded or accompanied with convulſions of the earth. If any exceptions have occurred, they have eſcaped my reſearches. It does not happen that *every place* where peſtilence prevails is ſhaken; but during the progreſs of the diſeaſes which I denominate *peſtilence*, and which run, in certain periods, over large portions of the globe, ſome parts of the earth, and eſpecially thoſe which abound moſt with ſubterranean fire, are violently agitated.

"By adverting to the foregoing hiſtory, the reader will find that all thoſe years in which conſiderable earthquakes have occurred in America, have been remarkably ſickly. Theſe years are 1638, 1647, 1658, 1662-3, 1668, 1727, 1755, 1783. See the hiſtory and the bills of mortality. Even the ſlighter ſhocks have been attended with conſiderable ſickneſs, or have introduced a ſeries of epidemics, being cotemporary with the meaſles, influenza or ſore throat, as in 1669, 1720, 1737, 1757, 1761, 1769, 1771, 1791, 1797.

* "Modern philoſophy objects to the popular ſenſe in which the word *elements* is uſed; ſince it appears that what has uſually been conſidered as an *element*, is found, by modern chemiſtry, to be a compound ſubſtance, reſolvable into parts, in the nature and properties, diſtinct. Notwithſtanding theſe diſcoveries, I cannot conſent to diſcard the popular uſe of the word *element*. Nature preſents to the ſenſes of man fire, earth, air and water, in a particular and predominant form. This is the form in which they appear to be moſt uſeful to man, and to be the conſtituent materials of other ſubſtances, as well as the agents in carrying on the great viſible operations of the ſyſtem. I therefore conſider the popular diſtribution as natural and convenient.

" To enumerate the inſtances in Europe and Aſia, would be a uſeleſs repetition of the events related in the preceding hiſtory, to which the reader is referred.

" Another phenomenon, which, next to earthquakes, appears to be moſt cloſely connected with epidemic diſeaſes, is the eruption of fire from volcanic mountains. In this article hiſtory is deficient, or I have not been fortunate enough to find the works neceſſary to furniſh a complete view of theſe phenomena. There are whole centuries in which the books I have conſulted mention no eruption of Etna and Veſuvius. The account of eruptions in Iceland, from the year 1000, taken from Pennant's Arctic Zoology, vol. i. p. 331, is probably complete, or nearly ſo. Of the volcanoes in the Andes we have very few accounts, as well as of thoſe in the Moluccas. Of thoſe in the arctic regions of Aſia and America we know very little.

" Notwithſtanding theſe defects, we are able, by the eruptions in Italy, Sicily, and Iceland, to arrive to ſome very important concluſions. The reader muſt have noticed, in the preceding hiſtory, the coincidences in time between volcanic diſcharges and winters of unuſual ſeverity. Theſe diſcharges either precede or follow the winter. Thus the eruptions of 1766, 1779, and 1783, were immediately followed by intenſely cold winters. The ſevere winters of 1762-3, and 1779-80, were ſpeedily followed by eruptions. Theſe inſtances will ſerve as ſamples of the ordinary courſe of theſe events. Sometimes the eruptions continue, or are repeated, for a number of years in ſucceſſion; but the eruptions, when continued, are moderate, and the ſeaſons variable. When the volcanoes have been for ſome years quiet, and that ſuſpenſion is followed by a great diſcharge, it appears to me that ſevere winters invariably follow or precede the diſcharge, within a few months. So alſo, when an eruption is continued for a number of years, if at any time the diſcharge becomes violent, a ſevere winter attends it, as in 1669. Etna was in a ſtate of eruption from 1664 to 1679; but in 1669 the diſcharge was immenſely augmented, and the winters next preceding and following were very ſevere.

" There are ſome years in which eruptions are noted, of which I find no account reſpecting the ſeaſons. Perhaps ſome of theſe will, on further inveſtigation, be found to be exceptions.

" It is to be obſerved, that, in ſome caſes, a ſevere winter

extends to both hemiſpheres, ſometimes to one only, and, in a few caſes, to a part of a hemiſphere only. Thus, in 1607-8—1683-4—1762-3—1766-7—1779-80—1783-4, the ſeverity extended to both hemiſpheres. In 1640-41—1739-40, and in other inſtances, the ſevere winter in Europe preceded, by one year, a ſimilar winter in America. In a few inſtances, ſevere froſt takes place in one hemiſphere during a ſeries of mild winters in the other; but this is leſs common. In general, the ſeverity happens in both hemiſpheres at once, or in two winters in immediate ſucceſſion; and, as far as evidence has yet appeared, this ſeverity is cloſely attendant on volcanic diſcharges, with very few exceptions.

"Another phenomenon which uſually coincides in time with ſevere winters, is the approach of comets. I have been ſtruck with ſurprize at the coincidences of this kind. There are a few inſtances on record of mild winters during the appearances of theſe bodies; but in theſe caſes the comets have appeared to be ſmall, or to paſs the ſyſtem at an immenſe diſtance from the earth. The large comets, and thoſe which approach near to the earth, *ſeem* to produce, almoſt uniformly, great heat, exceſſive drouth, followed by very cold winters, tremendous ſtorms of wind, rain, ſnow and hail, unuſual tides, or ſwell of the ocean, and, uſually, volcanic eruptions. How far theſe phenomena are connected, as cauſe and effect, future obſervations may determine. Some of them occur ſo uniformly in the ſame year, that I cannot reſiſt the evidence of their connection.

"After a volcano has been many years quiet, its diſcharges are, I believe, always preceded by extreme drouth; and this defect of water is not only obſervable in the vicinity of the volcano, but often extends over a whole continent, if not over the world. Many inſtances have been related: it is ſufficient here to mention the exceſſive drouth in 1762 and 1782, preceding eruptions of Etna and Heckla. In theſe years almoſt all ſprings were exhauſted, over a great portion of America.

"Cold winters ſometimes follow wet ſeaſons, but, more generally, a very hot ſummer or very dry autumn. Sometimes two or three ſevere winters occur in ſucceſſion, as in 1766, 1767, and 1768—and in America, from 1796 to 1799.

"The years when comets approach, or volcanoes diſcharge fire, and when the atmoſphere exhibits fiery appearances, as meteors, ſtreams of light, and mock ſuns, are, beyond com-

pariſon, the moſt tempeſtuous. Witneſs the years 1766, 1771 and 1772, 1780, 1783, 1784 and 1785, 1788, 1797. In ſuch years the riſk on veſſels at ſea is greatly increaſed.

"As dry ſeaſons uſually precede volcanic eruptions, ſo very wet ſeaſons often follow them. This ſeems not to be the invariable courſe of events; but there are remarkable inſtances of deluging rains after theſe diſcharges. Witneſs the ſeaſons following the univerſal convulſions of the earth in 1692 and 1693, and 1766. Thus the electricity is re-conducted to the earth.

"In every caſe, I believe, this remark will be found true; that the approach of comets, and volcanic eruptions, diſturb the regular courſe of the ſeaſons. The heat of ſummer and the cold of winter are in extremes; more ſnow is generated in winter, and more hail in ſummer; tempeſts are more violent and frequent, meteors more numerous, and rain more unequally diſtributed over the earth.

"A ſeries of epidemic diſeaſes, meaſles, influenza, affections of the throat, followed by peſtilential fevers, appear generally to commence and take their departure from ſome of the great agitations of the elements above recited. This, at leaſt, has been the caſe in America in the four laſt periods, beginning with 1756 and 1757, 1769 and 1770, 1782 and 1783, 1788 and 1789. This fact will want no authority but a bare inſpection of the preceding hiſtory and tables.

"The continuance and the varieties of the diſeaſes ſeem to depend on ſimilar diſturbances in the elements; and, as the diſcharges and motions of the electrical fluid depend on no certain laws that are known, they are irregular, and may contribute to vary the order and the nature of diſeaſes. In ſome caſes there has been a continued ſeries of epidemics for twenty years, in which the common order is not exactly obſerved; but this is not frequent. A remarkable inſtance occurred between 1727 and 1744.

"Thoſe periods, in general, have been moſt diſtinguiſhed for ſickneſs over the world, in which the fire of the earth has exhibited the moſt numerous and violent effects. Witneſs the period from 1631 to 1637, when the three moſt noted volcanoes diſcharged immenſe quantities of fire and lava; and ſevere peſtilence extended over all Europe and America. A ſimilar remark may be made concerning the period of the laſt univerſal peſtilence in Europe, from 1663 to 1666—alſo from 1691 to 1695—from 1727 to 1730—1759 to 1764—1769 to

1772—1774 to 1777—1783 to 1786—and concerning ſome ſhorter periods, all of which produced epidemics in both hemiſpheres.

" Slighter eruptions and earthquakes, which are almoſt annual, ſeem to have leſs effect. The fire of the globe is in perpetual motion or action, and to this great agent, philoſophers are agreed, are to be aſcribed the changes of ſeaſons, and the generation of rain, hail and ſnow. Its operations, however, are not all of them viſible, nor even perceptible, until they appear by their effects. It is probable that the *inviſible* operations of the electrical fluid produce more effects than thoſe which are ſeen. Indeed, we may queſtion whether moſt of the viſible phenomena of that principle are not mere *effects* of that action which influences the vegetable and animal world. It is probable to me that neither ſeaſons, earthquakes, nor volcanic eruptions, are the cauſes of the principal derangements we behold in animal and vegetable life, but are themſelves the *effects* of thoſe motions and inviſible operations which affect mankind. Hence catarrh, and other epidemics, often appear *before* the viſible phenomena of eruptions and earthquakes."

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We have no heſitation to admit, that the frequent coincidence of theſe great phenomena, as ſtated by Mr. Webſter, is a moſt intereſting fact in the order of nature. Enough has been obſerved to ſtimulate inquiry to the utmoſt; and it is to be hoped, that inceſſant attention will be directed to this object, until our diſcoveries concerning it become more ſatisfactory and complete. We may, however, be permitted to remark, that it is requiſite to know much more of nature before we can hope to aſcertain the preciſe degree of connection or dependence of theſe occurrences upon one another; whether they ſtand in the relation of cauſe and effect, or whether they may all be conſidered as effects of a common cauſe. To determine this point with accuracy, not only more numerous and more minute obſervations will be neceſſary, but, as the eſtimate of the coincidences exhibits a negative as well as an affirmative reſult, it remains, as exactly as poſſible, to adjuſt this proportion before we can ſafely deduce principles, or arrive at a firm concluſion.

We cannot help repeating our hopes that this work may be generally read. A phyſician muſt bluſh at the neglect to avail himſelf of the maſs of information here offered to view,

more eſpecially in the preſent ſtate of our country, when the terrors of peſtilence annually invade every boſom. But we indulge the perſuaſion that this work will be attentively peruſed greatly beyond the limits of the medical profeſſion. No perſon ſhould be ignorant of it who ſuffers his mind ever to paſs beyond the line of his immediate vocation. It is to the honour of the preſent age that an acquaintance with the elements of medicine, and of all its auxiliary branches of knowledge, is becoming much more popular, and more widely diſſeminated than formerly. If this acquaintance ſhould be enlarged, by ſtripping that ſcience of ſtill more of its technical jargon and myſterious mummery, the advantages would be incalculable. All who prepare themſelves for the departments of civil and active life, and even ſuch as devote themſelves, in their cloſets, to mere ſpeculations on the intereſts and improvement of mankind, will here find an abundance of matter for uſe as well as for meditation. The legiſlator, the civil magiſtrate, the political economiſt, the military and naval commander, and the patriot who conſecrates his labours to the ſervice of his country, may all draw from hence information of importance to the proſecution of their reſpective objects.

In the remainder of the ſecond volume Mr. Webſter proceeds to deduce many principles and opinions from the body of facts which occupies the preceding parts of the work. In many of theſe we ſhall entirely concur with him; concerning others we entertain doubts; and, with reſpect to ſome, we ſhall be conſtrained to diſſent from this eſtimable author.

(To be continued.)

ART. IV. *Hiſtory of the Peſtilence commonly called Yellow Fever, which almoſt deſolated Philadelphia in the Months of Auguſt, September and October,* 1798. *By* Thomas Condie *and* Richard Folwell. *Philadelphia.* Folwell. 8vo. pp. about 200.

THE maſs of information contained in this piece, relative to the viſitation of Philadelphia by the plague in 1798, renders it an intereſting compilation. It is not only calculated to gratify the curioſity of the inhabitants on their return to

their homes, after ſeveral months of exile and diſperſion; but is capable of affording inſtruction to the hiſtorian, or man of reſearch, who, at a future day, may wiſh to conſult an original performance. This, and ſimilar publications, will, in ſeveral reſpects, acquire additional value by age, and the generation to come will probably reſort to them as authorities. Mr. Condie and Mr. Folwell have ſaved from oblivion a great number of facts and events, highly worthy of preſervation. Accounts of plagues, and diſaſters by ſickneſs, deſerve to be conſidered as important parts of the hiſtory of the human ſpecies. A mortality which exceeds four thouſand deaths in about three months (p. 108), well deſerves to be remembered.

The perſon who wiſhes to ſee meteorological regiſters for 1798, and ſeveral of the preceding years; to examine daily returns of the ſick, as well thoſe who recovered as thoſe who died; and to inſpect a liſt of the names of the deceaſed, may be fully gratified by conſulting this publication.

He will find alſo a ſketch of the ſituation, population, and climate of Philadelphia, with an enumeration of ſome natural phenomena, and diſeaſes of domeſtic animals, which preceded the plague, and a ſummary of opinions concerning the nature of the peſtilential matter.

He may peruſe, likewiſe, a parcel of affidavits, queries and their anſwers, and a number of other ſtatements on the ſtanding themes of altercation, whether the diſtemper is contagious or not? imported or otherwiſe? Of theſe, as being the leaſt uſeful part of the work, we ſhall not attempt an abſtract; but refer ſuch of our readers as are fond of this ſort of controverſy to the papers and vouchers themſelves.

On theſe queſtions we preſume our opinion is generally known. We think that *putrid* matter may be converted into *peſtilential* matter, by certain chemical changes in the *fluids perſpired* from the ſkin of human beings, and remaining too long in their garments; and in their *alvine* and *urinary diſcharges*, whether kept in chambers or thrown into holes in the earth; and, in many inſtances, even *in the ſtomach and inteſtines themſelves*, whence poiſon may be ejected by *vomiting* and in *ſtools*. Under equal circumſtances, this appears to have been the caſe at all times and places; and it prevails now, in America, as it does, and ever uſed to do, in Europe, Africa and Aſia. Human excretions are prone to turn to peſtilence every where; and, in the order of Providence, this is wiſely ordained, leſt mankind, if not thus in-

commoded by them, ſhould wallow in their own naſtineſs. In all thoſe caſes, however, the venom derived from human bodies, or their excrements, is not of a ſpecific kind, prepared by vaſcular action, but of that common quality which putrefaction engenders occaſionally in all that claſs of inanimate natural bodies which contains its conſtituent ingredients. A yellow fever or a dyſentery may, therefore, be as readily derived from the ſeptic fumes of a barrel of corrupting beef or fiſh, as from a jorden filled with ſimilar animal ſubſtances, in as advanced a ſtate of corruption, diſcharged from the ſtomach and inteſtines of a perſon who has fed freely on thoſe articles of food.

Of peſtilential fluids ſo produced, ſhips are well known to be both the manufactories and vehicles. When ſhips arrive at the ports of their deſtination, the poiſon they contain is, of courſe, carried along within them, and miſchievous effects frequently enſue. Peſtilence, then, is ſaid *to be imported*. If by the word "import" is meant the "mere bringing in," there can be no doubt of its being a frequent occurrence. But it by no means follows, from this conceſſion, that peſtilence is imported, in *the common and commercial acceptation of the term, like merchandize*, FROM A FOREIGN HARBOUR OR CITY. A plain and frequent occurrence on board of veſſels will illuſtrate the difference of the caſes. Suppoſe a Chineſe ſow, or other female animal, on a long voyage, ſhould bring forth a litter of young in the part of a ſhip allotted to her, and that the young ones ſo produced at ſea ſhould arrive at Philadelphia, it would be literally true that the brood of pigs were imported into that city, but it would be utterly falſe to affirm they were imported from Canton. What is true of this race of young animals is true of peſtilential fluids: "THEY WERE NOT BROUGHT FROM FOREIGN PORTS, BUT ENGENDERED AND BRED ON BOARD."

ART. V. *An Account of the Malignant Fever lately prevalent in the City of New-York (in 1798).* By James Hardie, *A. M. New-York.* Hurtin *and* M'Farlane. 8vo. pp. 140. 1799.

THIS is a valuable local pamphlet, and well calculated to exhibit and preſerve many remarkable tranſactions during the plague of New-York in 1798. We conſider records of this kind, made while materials are eaſily to be procured, and while the recency of events enables the compiler to be correct in relating them, as choice portions of hiſtory. And we have to regret, that ſo few of the ſurvivors of great and volent diſtempers have thought it worth the while to commit to writing what they witneſſed during their prevalence. Publications like the preſent contain ſtrong delineations of human character, in times of ſuch public calamity, as almoſt diſſolve the ties of ſociety. It is to be hoped that regiſters of the principal events during ſuch ſeaſons of diſtreſs will always be kept. The want of ſuch monuments leaves us in the dark with reſpect to ſome ſevere epidemics with which the earlier ſettlements of Europeans and their deſcendants, in America, were, in former days, afflicted.

The author of the compilation now before us was in the city during the peſtilence; and, during much of the time, engaged in attending the ſick, and diſpoſing of the dead. We have reaſon to believe the account given by Mr. Hardie, of the manner in which the poor were provided for and relieved, is authentic. There is equal reaſon to conclude the liſt of donations from benevolent and generous citizens, in the ſurrounding towns and counties, for the uſe of the indigent, is correct. And we have no cauſe to queſtion the pains he took to make a full catalogue of the names of the deceaſed, which he has given alphabetically.

Mr. H. computes the deaths of the inhabitants of New-York, by the yellow fever, in the ſummer and autumn of 1798, to be two thouſand and eighty-ſix.—The medical reader is informed, that in the firſt part of the work is a number of medical facts and opinions, well worthy of being conſulted and remembered.

ART. VI. *A ſhort Account of the Yellow Fever, as it appeared in New-London, in Auguſt, September and October, 1798, with an accurate Liſt of thoſe who died of the Diſeaſe, the Donations, &c. &c.* By Charles Holt. *New-London.* Holt. 1798. 8vo. pp. 24.

FROM this pamphlet we learn, that between the 25th of Auguſt and the 28th of October, there died, in New-London, eighty-one perſons, of the diſeaſe called *yellow fever.*

Mr. Holt informs his readers that the exciting cauſe of the peſtilence was not ſuſpected to be imported, but believed generally to have originated in New-London; that the diſtemper was not contagious; that the infection was limited to a part of the city where the local cauſes exiſted; that when perſons, ſickening in that portion of the atmoſphere, were carried away into the pure air, and died there, the diſtemper did not ſpread from them to their attendants; and that, in ſome caſes, the ſick were afflicted with *glandular ſwellings*, or *buboes.*

For further particulars concerning the affliction of the citizens of New-London in 1798, our readers will recollect the inſtructive communications of the Rev. Dr. Channing, and the excellent phyſician Dr. Coit, publiſhed in our vol. ii. p. 402—408; to which we refer them.

ART. VII. *Report of the Committee appointed by the Medical Society of the State of New-York, to inquire into the Symptoms, Origin, Cauſe and Prevention of the Peſtilential Diſeaſe that prevailed in New-York during the Summer and Autumn of the Year* 1798. *New-York.* 8vo. pp. 47. 1799.

THIS is the report of the Committee of whoſe appointment we made mention in our vol. ii. p. 219. It was accepted by the Medical Society, and, as we learn, printed at their expenſe. There is much good advice in the pamphlet to the citizens of New-York, concerning the removal of filth and nuiſances, as local ſources of diſtempers, and many of the worſt and moſt dangerous ſources of peſtilential exhala-

tions are pointed out. The public ſewers, the new-made grounds, the docks and ſlips, ſinks and privies, beef, pork, fiſh and hides, burying-grounds and foul cellars, kitchens and yards, are ſeverally the ſubjects of animadverſion, on account of the ſeptic vapours which they afford.

The Committee are oppoſed to the opinion of importing the exciting cauſe of the peſtilence of the American cities from foreign places. On the queſtion of its origin, they expreſs their belief,

"That yellow fever may be produced in any country by peſtilential effluvia, without receiving an atom from a perſon ſick of a ſimilar diſeaſe; and that, from the moſt accurate reſearches they have been able to make, they think themſelves warranted in ſaying it may ariſe *on ſhore, and in this city, as readily as in the Weſt-Indies or on ſhip-board*; and this deſtroying, though ſecret agent, is none other than peſtilential vapours. They think, moreover, as the reſult of their experience, that the yellow fever is not a contagious or *catching diſeaſe*, in the popular and common acceptation of the phraſe; that it is not communicable from perſon to perſon in a pure atmoſphere, but ſpreads only in an air loaded and contaminated by putrid exhalations.

"If this be the fact, the advocates for *importation* will agree with the favourers of *local origin* in the adoption of adequate regulations on ſhore, let them differ ever ſo widely upon the ſpeculative queſtion.

"In all events, it happily turns out that the means neceſſary, in the opinion of one party, to hinder the ſpread *of the fever imported*, exactly coincide with thoſe recommended by their opponents, for the prevention *of its domeſtic manufacture.*"

The diſeaſe which they inveſtigated is deſcribed as often attacking, under the mild and unalarming guiſe of ſlight catarrh or common cold; and, in its progreſs, exhibiting, along with the ordinary ſymptoms of increaſed or irregular action, bleedings from various parts of the body, abſceſſes, buboes or glandular ſwellings, black-vomitings, convulſions, and mortifications.

Subjoined to the report is an inſtructive affidavit of the maſter, and another of the mate of the ſloop Iris, of New-Haven, in which the pretended importation of yellow fever into that city, in 1794, is fully explained away.

ART. VIII. *Obſervations upon the Origin of the Malignant Bilious, or Yellow Fever, in Philadelphia, and upon the Means of preventing it: addreſſed to the Citizens of Philadelphia.* By Benjamin Ruſh. *Philadelphia.* Dobſon. 8vo. pp. 28. 1799.

IN free governments, where the will of the people forms the ſupreme law, it is eſpecially neceſſary that they be well informed of their intereſts and their duties. The viſitation of moſt of the large cities of the United States by a malignant and mortal ſickneſs, within a few years paſt, has rendered it neceſſary to enact laws, and to undertake various improvements, with a view to the prevention of that calamity. In order to take theſe meaſures with advantage, it becomes neceſſary for the governing powers, and, conſequently, for the people, to decide on the origin of that ſickneſs in the beſt poſſible manner.

To aſſiſt the judgment of the community on this point, and to guard againſt the fallacy which beſets ſome parts of ſuch an intricate diſcuſſion, is the object of the pamphlet now before us. And, to the end that theſe obſervations may be more univerſally underſtood, the author adopts a popular mode of treating his ſubject, ſuited, at once, to every capacity.

In conſidering the remote cauſes of the yellow fever, the author aſſerts that it is the offspring of putrid vegetable and animal exhalations in all countries; and in Philadelphia he aſſigns the following ſources: the docks—the foul air of ſhips—the common ſewers—the gutters—dirty cellars and yards—privies—putrefying maſſes of matter lying in the neighbourhood of the city—and impure pump-water.

To account for the yellow fever not occurring in Philadelphia more frequently before the year 1793, and eſpecially on occaſions of the city being remarkably overſpread with filthy and putrid ſubſtances, the author maintains that three cauſes muſt co-operate to render peſtilential diſeaſes epidemic, viz. putrid exhalations—an inflammatory conſtitution of the atmoſphere—and ſome exciting cauſe, ſuch as great heat, cold, fatigue, intemperance in eating and drinking, &c. In proof of the exiſtence of a peculiar conſtitution of the air, for ſome years paſt, in this country, and of the doctrine of epidemic conſtitutions generally, the author adduces many facts, examples and authorities; among others, ſome remarkable pheno-

mena of animal and vegetable life, the multiplication of inſects, the rapid maturity and decay of fruits, the diſeaſes of cattle and other animals, &c. It is aſtoniſhing to find phyſicians, at the preſent day, aſking for proof of the fact of peculiar morbid conſtitutions of the atmoſphere, of various extent and duration, when the hiſtory of diſeaſes, in all ages and regions of the globe, leaves not a doubt on the ſubject. Can any perſon, accuſtomed to obſerve diſeaſes for half a ſcore of years, have failed to remark the impoſſibility of accounting for epidemic influences by any operation of the ſenſible qualities of the atmoſphere? Among intelligent and candid men, it ſeems to us, there can be but one opinion of this queſtion. And in further anſwer to the inquiry above ſtated, our author aſks, Why was not the yellow fever imported oftener from the Weſt-Indies, ſeeing it is ſeldom abſent from thoſe iſlands?

It has been demanded, ſays our author, why the yellow fever does not prevail every year, in cities where the filth is always the ſame in quantity and quality? For theſe differences, in the event, he accounts, by aſcribing them to the various degrees of dryneſs or liquidity produced by heavy rains or drought, ſo as to prevent the eſcape of noxious exhalations from ſuch maſſes of filth. However this may be explained, it is an undeniable fact, that in low and marſhy countries, commonly emitting great quantities of miaſmata in the ſummer and autumn, the epidemic fevers of thoſe ſeaſons ſometimes rage in one diſtrict and ſometimes in another, often leaving large portions of the country nearly exempted, or affected in a much lighter manner. Is not this a fact exactly analogous to that of the yellow fever ravaging one city, while a neighbouring one, apparently in the ſame circumſtances, is nearly or altogether exempt?

On the queſtion of the contagiouſneſs of the yellow fever, our author remarks, that contagion is of two kinds, viz. *ſecreted*, as in ſmall-pox and meazles, and generally called ſpecific—or formed out of the body by the ſtagnation and confinement of the vapours emitted from animal excretions, owing to a defect of cleanlineſs and ventilation. The former he rejects entirely; the latter, he acknowledges, may ſometimes act like the noxious exhalations from other putrid bodies. This diſtinction, he thinks, is clearly proved by the effects of heavy rains and froſt in extinguiſhing the diſeaſe; for theſe could not be ſuppoſed to act upon matters diſcharged from the bodies of the ſick.

Dr. R. denies, therefore, that the yellow fever can be imported, ſo as to become epidemic, in any city or country. And ſo far is the opinion of domeſtic origin from tending to ruin the credit and commerce of a trading place, that the reverſe is true. By admitting that it is generated at home, we ſhall ſoon be impelled to remove its cauſes; whereas, by ſuppoſing that it may be imported, and acting accordingly, we ſhall be led to neglect the removal of the noxious ſources.

The addreſs is concluded by offering a number of directions for the removal of putrid ſubſtances from the docks, wharves, gutters, privies, cellars, yards, and other places calculated to collect and retain them—for ſecuring the cleanlineſs and ventilation of ſhips—and alſo for the management of diet, the preſervation of bodily cleanlineſs, &c.

ART. IX. *A ſecond Addreſs to the Citizens of Philadelphia, containing additional Proofs of the Domeſtic Origin of the Malignant Bilious or Yellow Fever: to which are added, Obſervations intended to ſhew that a Belief in that Opinion is calculated to leſſen the Mortality of the Diſeaſe, and to prevent its Recurrence. By* Benjamin Ruſh. *Philadelphia.* Dobſon. 8vo. pp. 40. 1799.

PURSUING the ſame object as in the former addreſs, Dr. Ruſh proceeds to give, in this pamphlet, a popular view of many facts and opinions heretofore publiſhed in ſuch forms as to confine their peruſal chiefly to profeſſional readers. It is to be deeply lamented that ſo much difference of opinion has taken place in the cities of the United States, concerning the origin and treatment of the yellow fever. But theſe differences will probably work many beneficial effects in the end. The community will eagerly diſcuſs a ſubject in which they feel ſo lively an intereſt; and the advocates of oppoſite opinions will gradually familiarize to the public mind many of the leading facts and principles upon which the diſpute muſt ultimately be ſettled. And much of this knowledge will be rendered indelible by aſſociation with the calamities to which it owes its exiſtence.

The repugnance of many American phyſicians and people to the Sydenhamian doctrine of epidemic conſtitutions of the atmoſphere, induces our author, in the beginning of this ad-

dreſs, to enlarge the number of facts and authorities which he had formerly exhibited in proof of that principle. Theſe are conciſe, but, at the ſame time, forcible and appropriate.

In the next place Dr. R. explains and refutes ſeveral of the more plauſible topics of reaſoning in favour of the contagiouſneſs of the diſeaſe, and not only oppoſes the opinion of its importation, but alſo exhibits a multitude of miſchiefs reſulting from the medical and popular belief of that error.

Suppoſing that the mortality of the yellow fever has been much increaſed by certain prejudices and errors, which prevail, more or leſs, among all claſſes of citizens in Philadelphia, concerning its treatment, Dr. R. adds a few general remarks on this ſubject. He accounts for much unavoidable diverſity in the modes of treatment, at different times and places, from variations of climate and ſeaſon, as well as thoſe which ariſe from age, ſex, and habit. The remedies conſidered here are the various forms of evacuants, comprizing blood-letting, purges, vomits, ſudorifics, and ſalivation. To theſe evacuating remedies are added, cold air, cold water, and ice. And, with reſpect to all of them, the principles which govern the ſelection or combination, in different circumſtances, are briefly mentioned. With an expoſition of the peculiar advantages of blood-letting, and a reply to ſome of the objections offered to it, the addreſs is concluded.

The perſpicuous and popular exhibition of the ſubject in this and the former addreſs, as well as the body of evidence they contain in ſupport of the domeſtic origin of the yellow fever, will recommend them to the peruſal of all who ſeek information on that topic.

ART. X. *An Inaugural Diſſertation on the Principle of Animation; read and defended at a public Examination, before the Hon.* John Wheelock, *LL. D. Preſident, and the Governors of Dartmouth College, for the Degree of Batchelor in Medicine, July* 18, 1799. *By* Daniel Adams, *A. B. Hanover (N. H.)* Davis. 1799. 8vo. pp. 27.

IN this Diſſertation Mr. Adams rejects the opinion, that the principle of animation is an etherial ſpirit of ſuch extreme ſubtilty as to pervade indifferently all bodies; as likewiſe the notion of its being a ſecretion of the brain. Nervous fluid,

igneous fluid, electric fluid, and ſpirit of animation, are all excluded from their pretenſions to be the prime movers of the animal machine.

He thinks irritability the characteriſtic of life; that life is manifeſted by the performance of certain functions; and that vital functions cannot be carried on without OXYGEN. This is, therefore, the *ſine qua non* of animal and vegetable life, which the embryo of viviparous animals receives from its parents; of oviparous creatures, through their ſhells and membranes, from the atmoſphere; and which vegetating ſeeds and adult animals derive from the ſame ſource. In all theſe particulars he adheres to the more probable doctrines of the day.

Throughout this Diſſertation there is an ingenuous ſpirit which we approve; and a turn for experimental inquiry is manifeſted, which promiſes greater things if properly cultivated.

MEDICAL & PHILOSOPHICAL NEWS.

DOMESTIC.

PLAN *for* OBSERVATIONS *on the* WEATHER, SEASONS, *and* PHYSICAL PHENOMENA.

THE Hiſtory of Peſtilence, juſt publiſhed by Mr. Webſter, exhibits, among various other curious and inſtructive particulars, a connection or contemporaneouſneſs of volcanic diſcharges and drought in ſummer, and cold, ſnow and hail in winter. Theſe phyſical phenomena, indicating great commotions and changes in the earth and its atmoſphere, are found to have a near connection with that general vitiation of the air which precedes and cauſes epidemic diſtempers. For obtaining, therefore, a full and complete knowledge of theſe plagues, in their varied forms of influenza, catarrh, meazles, ſore-throat, dyſentery, fever and peſtilence, he judges that our knowledge of natural phenomena ſhould be enlarged, by collecting facts and recording obſervations touching all theſe great events taking place on our globe. Impreſſed with theſe views of the ſubject, the Connecticut Academy of Arts and Sciences paſſed the following vote at a late meeting:

"*Reſolved*, That this Academy will endeavour to collect and preſerve, for publication, a regular ſeries of facts, reſpecting the following phenomena of nature: the variations of the thermometer and barometer—extraordinary changes of weather, and ſtorms of all kinds—ſtate of the ſeaſons—unuſual tides—celeſtial appearances—earthquakes—unuſual numbers of inſects—commencement, progreſs, and termination of epidemic diſeaſes among men and other animals—and other remarkable phyſical phenomena—noting, in all caſes, the preciſe time when any extraordinary occurrence begins and ends: that, for this purpoſe, a regiſter be kept, in which ſhall be entered every day in the year with a large blank."

There is reaſon to believe, that too much time and talent have been ſpent, within the laſt twenty years, in making ex-

periments, deviſed, and often very badly, by the human head. Nature is the beſt experimenter; but the experiments which ſhe makes want OBSERVERS and INTERPRETERS. To *obſerve* and *interpret nature* is the way to be truly wiſe and ſcientific. For theſe purpoſes *facts* muſt be collected, and from different parts of the earth. With a due portion of the ſpirit which actuated Ariſtotle, Pliny and Bacon, a vaſt deal might be done in America, at this eventful time, in a few years. We hope ſoon to hear that the example of Connecticut is followed; and that Albany, Boſton, New-York, Providence, Philadelphia, Baltimore, Norfolk, Newbern, and Charleſton, will vie with each other in the correctneſs of their regiſters. Profeſſor Meigs, who, we underſtand, began the ſeries of obſervations on the firſt day of January, 1800, at New-Haven, notes the indication of the quickſilver in the thermometer thrice a day, at ſun-riſe, at two o'clock afternoon, and at ſun-ſet; the firſt being the coldeſt, the ſecond the warmeſt, and the third the mean temperature of the natural day. A blank leaf is left in the book after each day, for the purpoſe of entering *hereafter*, in its place, any ſingular or memorable events in any part of the earth, however diſtant—ſuch as earthquakes, volcanic eruptions, great tempeſts, or other atmoſpherical commotions—local or general ſickneſs among the human ſpecies or brute animals, the multiplication of inſects and reptiles, the prevalence of drought, the occurrence of hail, and all other phyſical appearances. It is to be deſired that the gentlemen who undertake to keep ſimilar records of ſuch events, in different parts of America, may conform, as nearly as poſſible, to this plan; that thereby a compariſon of the different regiſters may be more eaſily and exactly made.

NEWLY-INVENTED VIBRATING STEELYARD.

A ſteelyard has been invented by Mr. Benjamin Dearborn, of Maſſachuſetts, in which the centre of motion, centre of gravity, and points of ſuſpenſion, are ſo adjuſted, that the beam vibrates like a ſcale-beam, when loaded with weights in equilibrium, and when unloaded. He has obtained a patent for his invention, under the title of the "vibrating ſteelyard." Beſides the advantages of the common ſteelyard, Mr. D.'s inſtrument poſſeſſes the property of being ſtrictly accurate: it has but too hooks; never requires to be reverſed; has the poiſes adjuſted to *certain* weights, which may be ſealed

like other weights; gives, by inſpection, both *neat* and *groſs* hundreds; and may be purchaſed at a moderate price. Such an improvement in determining the weight of articles bought and ſold, ought to attract the notice of houſe-keepers and dealers of every deſcription, as it is ſaid to poſſeſs great advantages for weighing *with eaſe, diſpatch and certainty.*

Mathematics and Physics.

We learn that Jared Mansfield, of New-Haven, intends to publiſh a collection of eſſays, mathematical and phyſical, in which, among other ſubjects, there will be a diſſertation on the negative ſign in algebra, with an explanation of the mathematical limits of *nothing* and *infinity*; a *theory of fluxionary analyſis*, and *an explanation of the moon's theory.*

Agricultural Society of New-York.

A *fourth* number of the Tranſactions of the Society for promoting Agriculture, Arts and Manufactures, is now in the preſs: it will probably be completed in the courſe of the winter. This publication will be a ſequel of the piece noticed in our Review, Med. Repoſ. vol. ii. p. 315. The collections of this ſociety have hitherto been printed at the expenſe of the State, purſuant to concurrent reſolutions of both houſes of the Legiſlature, and diſtributed to the citizens in the ſame manner that copies of the laws and legiſlative journals are. This is an eaſy and economical mode of diffuſing hints, ſpeculations, experiments and improvements, and well worthy of imitation by the Legiſlatures of our ſiſter States.

Produce of Maize, or Indian Corn.

The varieties of this valuable grain are become very numerous. Its vegetative powers are found to be admirably adapted to the diſtant climates of Nova-Scotia and the Carolinas, on the American continent. Farmers are not agreed which variety of the grain is moſt productive. Each ſoil and latitude undoubtedly has its particular and preferable ſort of maize. We mention, however, for the information of our readers, a kind of Indian corn which grew laſt ſeaſon on Manhattan Iſland, at Haerlem. The ear contained *ſixteen rows* of grains. Theſe were well ripened, of a middling ſize, and of

a very firm ſtructure. Not a row contained leſs than *fifty grains*. So that the product of the ſingle ear of maize was more than *eight hundred grains*. It is ſubmitted to the conſideration of farmers, whether the cultivation of this variety would not anſwer an important purpoſe in huſbandry.

Midwifery.

Dr. V. Seaman, phyſician extraordinary to the lying-in ward in the Alms-Houſe of New-York, who has been, as our readers will recollect (Med. Rep. vol. ii. p. 437), engaged, during the laſt year, in giving obſtetrical inſtruction *to females*, intends ſoon to publiſh a ſyllabus of his lectures, and a ſummary of the practical matter they contain, for the information of midwives and mothers, in a conciſe, plain, and eaſy manner.

Remedy for Scirrhus and Cancer.

The citizens of the United States, eſpecially thoſe of the State of Pennſylvania, have often heard of Dr. Tate, and his ſecret remedy for ſcirrhous and cancerous tumors. William Torbert, now of New-York, having become poſſeſſed of the method which Tate purſued, has, for a conſiderable time, practiſed it in the city and its vicinity; and, evidently, with more ſucceſs than attends the adminiſtration of the uſual remedies. He employs both internal and external means, according to the circumſtances of the caſe, but makes no uſe of the knife.

Cure of Gonorrhœa Virulenta *by Soap-Injection.*

Dear Sir, *New-York Hoſpital, Feb.* 5, 1800.

Incloſed I ſend you an abſtract of the four caſes of gonorrhœa which you treated in the Hoſpital; from it you will eaſily recollect the particulars of each. Dr. Rodgers, knowing the inefficacy of the common remedies, has alſo been induced to make trial of *thoſe* which you preſcribed. The reſult of the only three caſes that occurred, which I likewiſe ſend you, will beſt teſtify whether *they* were entitled to his confidence. With much reſpect,

I am, Sir, yours, &c.

SAMUEL HAYES,
Apothecary to the Houſe.

Samuel L. Mitchill.

The injection uſed in the following caſes was a ſolution of Caſtile ſoap ʒ ij. in hot water ℥ v. with directions to be uſed from ſix to ten times a-day. A piece of ſoap and ſponge was ordered for them to keep the parts clean; and the ulcers and incipient chancres, in the caſes in which they are mentioned, were touched, twice a-day, with a camel's hair bruſh, dipped in the deliqueſcent carbonate of pot-aſh.

Thomas Colwell, a ſeaman, aged thirty-ſix years, was admitted on the 7th of November, with virulent gonorrhœa, of about thirteen days ſtanding. The preputium was conſiderably inflamed and ſwoln, amounting almoſt to phymoſis. He was of a coſtive habit of body, and was, therefore, put upon the uſe of the following cathartic; viz. jalap gr. iij. calom. gr. i. made into a pill with lenitive electuary. They had the deſired effect. He was diſcharged, cured, on the 23d of the ſame month, without the appearance of any other unpleaſant ſymptom.

Jonathan Dawſon, mariner, aged twenty years, was admitted, on the 5th November, with virulent gonorrhœa, phymoſis, and much tumefaction of the prepuce. On the 7th there appeared to be ſome affection of the inguinal glands of the right ſide, and it is noted that he complained of coſtiveneſs. He was directed to take two of the above pills of calom. and jalap every day. On the 12th the pills were omitted, he being ſlightly ſalivated; and, on examination, it was found that he had been plied with mercury previous to his admiſſion. When the diſeaſe was ſo far reduced that the prepuce could be retracted, there was found in its fold on the right ſide, juſt behind the glans, a deep and foul ulcer, and two ſmaller ones were near it. Theſe were touched with the deliqueſcent carbonate of pot-aſh, and were ſoon healed. The bubo never came to ſuppuration. He afterwards gradually mended; and, though he was known to be frequently intoxicated, he was cured, and diſcharged on the 22d January.

William Collins, mariner, aged twenty-four years, was admitted, on the 19th November, with virulent gonorrhœa, and ſome inflammation and incipient chancres on the prepuce and glans penis. To obviate coſtiveneſs, he uſed now and then a cathartic of ſulphate of ſoda—no other was given. On the 6th of December he was well, and diſcharged cured.

Robert Sparks, a ſeaman, aged twenty-nine years, was admitted into the Hoſpital on the 12th November, and the following note was taken of his caſe:—Venereal poiſon of about

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ſix days ſtanding, with ſcalding and blennorrhœa, inflammation of the glans penis, retraction and tumor of the prepuce, and incipient chancres. Theſe, though pretty extenſive and numerous, were quickly healed: but from ſome miſmanagement, either in the uſe of the ſyringe or injection, or from ſome other cauſe, he was, on the 1ſt of December, affected with hernia humoralis. This was relieved by the uſual means, and he gradually mended afterwards, and was, by his own deſire, diſcharged December 22d. It is but juſtice to obſerve, that this man was much accuſtomed to walk out, and almoſt every morning practiſed it. He alſo frequently indulged in draughts of gin, either from love of it, or an unhappy perſuaſion that it would relieve his complaint.

—

The three following caſes, under the care of Dr. Rodgers, were put upon the ſame remedies, excepting only that the ſolution was a little more dilute.

Daniel M'Bride, aged twenty, and Peter Peterſon, aged twenty-four years, ſeamen, each of an athletic habit of body, contracted the diſeaſe on the ſame night, which was about twelve days previous to their admiſſion on the 24th of December. Each had conſiderable running and ſcalding, with inflammation, and M'Bride had an ill-conditioned ulcer on the prepuce. In one of them the injection ſeemed to increaſe the ardor urinæ. This effect, however, was but momentary. Both mended rapidly, and were diſcharged cured, M'Bride January 14th, and Peterſon January 17th.

Elizabeth Marſhall, aged twenty-two years, admitted on the 14th January, was ordered to uſe the ſaturnine injection, for gonorrhœa virulenta, with which ſhe had been ill about a fortnight. From the happy iſſue of the preceding caſes, this injection was, on the 17th, changed for the ſolution of ſoap, which ſhe has ſince been in the uſe of, and to it ſhe aſcribes her cure, which is now (Feb. 5th) completed.

In point of cleanlineſs, this practice ſuffers nothing from compariſon with every other. None of the preceding caſes had any excoriations produced on the neighbouring parts from venereal virus lodged in them; on the contrary, the remedies always removed ſuch as were preſent. The ſurface of the ulcers was never left extended by the ſloughing off of ſubſtance deſtroyed by the deliq. carb. pot-aſh: they were uniformly kept clean, and in a healing condition. It may not

be improper to add, that of the above cases there has been no re-application for admiſſion, with a return of any of the ſymptoms.

SINGULAR EFFECTS *of* GASEOUS OXYD *of* SEPTON *(dephlogiſticated Nitrous Air).*

Northumberland, Jan. 30, 1800.

Dear Sir,

I ſend you an extract from a letter juſt received from my ſon in England, thinking it will gratify yourſelf, and the readers of the Medical Repoſitory.

"Mr. Watt deſired me to tell my father, that he has completely got the better of his aſthma, by breathing dephlogiſticated air, and he is in much better health in every reſpect. They are adminiſtering *dephlogiſticated nitrous air* to two paralytic patients, one of whom is nearly cured. It excites the nervous ſyſtem in a wonderful manner. Some that take it are thrown into fits of laughter, others into the moſt antic geſtures, affecting them much in the ſame way as if they were intoxicated, and in ſome it produces a ſtate of inſenſibility."

I have now in the preſs a work which I venture to entitle, *The Doctrine of Phlogiſton eſtabliſhed, and that of the Compoſition of Water refuted.* It contains all that I have hitherto publiſhed on the ſubject, with conſiderable additions. In this I may be ſaid, in the language of the preſent war, to have *made an attack on the whole line* of my opponents. As this war will probably laſt longer than that in Europe, I am glad to find my antagoniſts in ſuch cool, good temper, eſpecially Dr. Maclean, whoſe feelings I am ſorry to ſeem to have hurt, though I think he gave the occaſion. In candour and civility I will endeavour not to be exceeded by any perſon. Truth is, or ought to be, our common and only object. Your Repoſitory is the theatre of the conteſt, and I hope it will not be diſgraced by the illiberality of any writer in it.

With much reſpect, I am, dear Sir,
Yours ſincerely,

J. PRIESTLEY.

Dr. MITCHILL.

At a ſtated meeting of the Academy of Medicine, in Philadelphia, the following perſons were elected officers of the inſtitution:

Dr. Philip Syng Phyſick, Preſident.
Dr. Charles Caldwell, } Vice-Preſidents.
Dr. William Dewees, }
Dr. John C. Otto, Secretary.
Dr. James Gallaher, Librarian.
Dr. William Budd, Treaſurer.

The following perſons were appointed members of the ſtanding committees:

Drs. Charles Caldwell, William Dewees, James Meaſe, Felix Paſcalis, James Reynolds, } Committee of Correſpondence.

Drs. John Redman Coxe, John C. Otto, James Stewart, René La Roche, } Committee of Meteorology.

Drs. Benjamin Ruſh, Philip Syng Phyſick, Joſeph Strong, } Committee of Reviſion.

Drs. William Budd, James Gallaher, Iſaac Heylin, } Committee for Annual Bills of Mortality.

PHILOSOPHICAL SOCIETY *of the* STATE *of* DELAWARE.

Since the commencement of the preſent year, a number of gentlemen at Wilmington, in the State of Delaware, animated with the ſpirit of cultivating and diſſeminating a knowledge of the ſciences, have aſſociated themſelves, framed and organized a conſtitution, under the title of the "Philoſophical Society of the State of Delaware." The names of the officers are not yet come to hand.

A Deſcription of a Cement for preſerving Wood and Brick from Decay, and for ſtopping Leaks and Fiſſures in any Body to which it ſhall be applied; and of the Manner of uſing, and of the Proceſs of compounding the ſame. By the Rev. Silas Conſtant, *and ſecured to him by Patent.*

The compoſition, or cement, is compoſed of the following materials; viz. tar, pulverized coal (charcoal is eſteemed the beſt), and fine, well ſlacked lime; the coal and lime to be

well mixed together, proportioned at about four fifths coal and one fifth lime; the tar to be heated, and, while hot, thickened with the mixture of coal and lime, until it becomes ſo hard as that it may be eaſily ſpread upon the ſurface of a board, and not run off when hot. Turpentine or pitch will anſwer nearly as well as tar, and plaſter of Paris will anſwer inſtead of lime; to be uſed in the ſame manner, and about in the ſame proportions. The cement muſt be applied when warm, and is found to be uſed eaſieſt with a trowel.

PRIESTLEY'S SENTIMENTS *on the* DOCTRINE *of* SEPTON.

In his letters, particularly one of July 24, 1799, that celebrated philoſopher wrote from Northumberland, to Dr. Mitchill, thus: "I have no doubt of your having made a moſt important diſcovery, which ranks with the moſt brilliant that this age, fertile in diſcoveries, can boaſt, that the cauſe of contagious fever is of an *acid* nature, and ſome modification of the *nitrous*, which may, properly enough, be called *ſepton*," &c. &c.

Diſcovery of Septic Acid in the Alimentary Fæces of a Perſon deſperately ſick of Yellow Fever.

Among other particulars of a wretched caſe of yellow fever occurring in a man who had been expoſed to the vitiated air of the city of New-York, during the autumn of 1799, and who ſickened afterward in Clinton-Town, in Dutcheſs County, J. E. R. Birch, the attending phyſician, has written an account of the following experiments to Dr. Mitchill, in a letter dated Clinton, Feb. 11, 1800. The facts are the more memorable, as few perſons, though poſſeſſed of a philoſophical ſpirit, have determination and firmneſs enough to collect them from ſuch ſources.—"Hæmorrhages became frequent from his noſe. I obſerved that what he now diſcharged by ſtool was of the colour and conſiſtence of half-made (ſoft or black) ſoap, and was ſo extremely corroſive that it excoriated the ſkin wherever they came in contact. Immediately on diſcovering this, an injection of milk, recently taken from the cow (as nothing better could be procured in the place where the patient was at that time), was adminiſtered. He was unable to receive the whole of the injection, but parted with it in the act of receiving it. What he diſcharged came away

in the ſtate of perfect whey and curd; or, in other words, the ſerous part was perfectly ſeparated from the coagulable. Surprized at the ſtrength of the acid in his inteſtines, I repeated the injection, and the ſame effects were again obſervable. A few hours after he paſſed another ſmall ſtool, to which I added a ſmall quantity of aërated ſal ſodæ, and an effervescence enſued. I was now convinced that an acid more highly concentrated than I had hitherto ſuppoſed the inteſtinal canal poſſibly capable of containing, without deſtroying its organization or texture, really exiſted within his. The only queſtion that now remained was *its kind.* To determine this, I immerſed ſeveral pieces of linen cloth in one of his ſtools; and, after they had been gently dried, ſet them on fire. The brightneſs and colour of the flame, together with its dancing motion, tallied ſo exactly with the appearance obſervable in the combuſtion of bodies impregnated with nitre, that I readily concluded it to be of the ſeptic (nitric) quality. I am convinced theſe plain facts will go further to ſubſtantiate your ingenious doctrine of fever, than," &c. &c.

Decompoſition of Soap-ſuds by the Septic or Peſtilential Air of New-York, in 1798 *and* 1799.

J. N. Cowan, Doctor of Phyſic in the city of New-York, in a note to Dr. Mitchill, has written thus, January 21, 1800: —"I obſerved, in the time of the fever in 1798, that, in Veſey-ſtreet, a ſtrong lather of ſoap in water was decompoſed, in my lodgings, in the ſpace of three hours; and the ſeparation of the ingredients of the ſoap was ſo effectual as to require boiling water to detach the tallow from the baſon. In October, 1799, I was determined to try the experiment more fully. At the houſe No. 61 in John-ſtreet, I made a baſon full of ſuch lather of ſoap and water, and divided it into five parts. The houſe is three ſtories high, and the ground whereon it ſtands is about fifty feet above the level of the ſea. On the floor of each ſtory I placed a tea-ſaucer full. On the ground floor, and in the ſecond ſtory of a houſe in Water-ſtreet, I alſo placed ſaucers full of the ſolution of ſoap. The portion placed on the ground floor in John-ſtreet was decompoſed in ſix hours; that on the ground floor in Water-ſtreet in four hours; and all the reſt were decompoſed in times proportioned to their altitudes, as nearly as I could compute. To this acidity, which robs the ſoap of its alkali,

and ſuperabounds in the city-atmoſphere during the prevalence of yellow fever, I have aſcribed the peſtilence of the ſeaſons. As the *ſeptic* acid was not known or talked of at the time I received my medical education, I at firſt attributed the phenomenon entirely to the *carbonic* acid; but it appears to me now that *both* have their ſhare in producing the effect." It is deſerving of remark, that the fact of the ſpeedy decompoſition of ſolutions of ſoap in water, is confirmed by the obſervations of the waſher-women in the city of New-York, during the ſickly months in *ſummer and autumn.*

SEPTIC ACID VAPOURS EXTRICATED FROM CORRUPTING BEEF.

The Inſpector-General of beef and pork in the city of New-York, examined, during the ſummer and autumn of 1799, ſeveral thouſand barrels of corrupting meat. Much of this had been packed originally with too ſmall a quantity of the muriate of ſoda (common ſalt), and by bad citizens, who, in various ways, evaded the law of the commonwealth preſcribing the mode of curing proviſions for exportation. He employed, during the ſeaſon, forty perſons, including himſelf and his deputies, in inſpecting, repacking, and new-ſalting theſe articles of human food. They all obſerved, that when beef was about to ſpoil it became *ſour*, and that a manifeſt *acidity*, of a diſagreeable flavour, and very plainly to be *taſted*, was imparted to the pickle thus under-ſaturated with ſea-ſalt. On unheading the barrels, the exhalations from the meat in this ſtage of putrefaction were ſour to be ſmelled, as they roſe and ſpread in the atmoſphere. It was not until the ſourneſs had continued ſome time (perhaps ſeveral days, according to the quantity of the ſalt preſent), that the fœtid and truly ſtinking odour was extricated from the corrupting fleſh. This ſenſible *acidity* was formed principally on the *lean*, and not on the *fat*—from the *beef* much more copiouſly than from the *pork*. Afterwards the ſour fumes and the ſtinking vapours were formed and extricated together; though their acidity was commonly loſt, as far as reſpected ſenſation, in the more copious and obvious fœtor which attended. Theſe remarks on the acid quality of the putrefying fleſh, and of the gas flowing from it, correſpond with the obſervation of a number of citizens, that in 1798 the poiſonous exhalation from the obſtructed ſewer opening into Burling-ſlip, which killed

many of the neighbours who lived to leeward, was ſo ſour as to be ſmelled through the air; for into this ſewer had the putrid pickle of much corrupting beef been diſcharged for ſeveral preceding days. The acidity which, in the caſe of the proviſions, ſo ſenſibly affected the tongue and noſtrils, had been apparently formed by a junction of oxygen with ſepton, the azotic baſis of the meat. The effects next to be related cannot be properly aſcribed either to the carbonic or phoſphoric acids.

Where the ſkin of the hands of theſe repackers had been ſcratched or lacerated by the ends of bones, the acid liquor to which theſe little wounds were expoſed cauſed more than uſual ſoreneſs, with inflammation and difficulty of healing. Some of the putrid pickle, which accidentally was ſpilled upon the broken ſhin of one of the men, excited high inflammation, with ſo great lameneſs as to confine him. Such was the operation of ſeptic acid, even when mingled with a weak ſolution of the muriate of ſoda, and, of conſequence, in ſome meaſure neutralized or blunted by its alkali.

But this was not all: Of the forty men ſo acted upon by the ſeptic acid vapours and pickle, thirty-eight (the Inſpector-General himſelf being one) were afflicted with dyſenteries of various degrees of violence. And, beſides pains in the belly, teneſmus, and bloody ſtools, a conſiderable part of them experienced redneſs of the eyes, and other catarrhal ſymptoms, nauſea, and that condition of the arterial ſyſtem called fever. —Where is the uſe or propriety of the term "*nitrous*" or "*nitric*," applied to this acid, which never had been aſſociated with the fixed vegetable alkali into nitre?

MATTER *of the* VACCINE DISEASE *for* INOCULATION.

Dr. George Pearſon, of London, in a letter to Dr. Miller, juſt received, has obligingly tranſmitted a thread impregnated with the matter of the vaccine diſeaſe, for the purpoſe of inoculation in this country, with a view to its uſe as a ſubſtitute for the ſmall-pox.

In the ſame letter Dr. Pearſon mentions, that Mr. Tennant has lately diſcovered that certain limeſtones, which afforded lime deleterious to vegetation, contain a pretty large portion of magneſia alba; but that thoſe which are known to fertilize land contain none at all: that he has alſo proved the cauſe to be the magneſian earth, by experiments of ſowing ſeeds in ſoils containing the different kinds of calcareous earths.

Medical Intelligence from France.

By a letter from France, dated September 5th, 1799, to Dr. Mitchill, we learn that Mr. Adet, the ci-devant Miniſter of that Republic to the government of the United States, had been lately appointed a Profeſſor of Phyſic in the School of Paris, and had given up diplomatic affairs. His competitor was Valentin, formerly of Cape-François, over whom he prevailed by a ſmall number of votes.—A parcel of French pamphlets were ſent on to us by the conveyance which brought the letter.

From " THE TIMES," *a Newſpaper printed in Alexandria (Virginia), dated in December,* 1799.

Meſſrs. J. & D. Weſtcott,

Preſuming that ſome account of the late illneſs and death of General WASHINGTON will be generally intereſting, and particularly ſo to the profeſſors and practitioners of medicine throughout America, we requeſt you to publiſh the following ſtatement.

JAMES CRAIK,
ELISHA C. DICK.

Some time in the night of Friday the 13th inſtant, having been expoſed to rain on the preceding day, General Waſhington was attacked with an inflammatory affection of the upper part of the wind-pipe, called in technical language, *cynanche trachealis.* The diſeaſe commenced with a violent ague, accompanied with ſome pain in the upper and fore part of the throat, a ſenſe of ſtricture in the ſame part, a cough, and a difficult rather than a painful deglutition, which were ſoon ſucceeded by fever and a quick and laborious reſpiration. The neceſſity of blood-letting ſuggeſting itſelf to the General, he procured a bleeder in the neighbourhood, who took from his arm, in the night, twelve or fourteen ounces of blood: he would not by any means be prevailed upon by the family to ſend for the attending phyſician till the following morning, who arrived at Mount Vernon at about eleven o'clock on Saturday. Diſcovering the caſe to be highly alarming, and foreſeeing the fatal tendency of the diſeaſe, two conſulting phyſicians were immediately ſent for, who arrived, one at half after three, the other at four o'clock in the afternoon. In the interim were employed two copious bleedings; a bliſter was applied to the part affected, two moderate doſes of calomel were given, and

an injection was administered, which operated on the lower intestines—but all without any perceptible advantage; the respiration becoming still more difficult and distressing.—Upon the arrival of the first of the consulting physicians, it was agreed, as there were yet no signs of accumulation in the bronchial vessels of the lungs, to try the result of another bleeding, when about thirty-two ounces of blood were drawn, without the smallest apparent alleviation of the disease. Vapours of vinegar and water were frequently inhaled, ten grains of calomel were given, succeeded by repeated doses of emetic tartar, amounting, in all, to five or six grains, with no other effect than a copious discharge from the bowels. The powers of life seemed now manifestly yielding to the force of the disorder. Blisters were applied to the extremities, together with a cataplasm of bran and vinegar to the throat. Speaking, which was painful from the beginning, now became almost impracticable; respiration grew more and more contracted and imperfect, till half after eleven o'clock on Saturday night, when, retaining the full possession of his intellect, he expired without a struggle.

He was fully impressed at the beginning of his complaint, as well as through every succeeding stage of it, that its conclusion would be mortal, submitting to the several exertions made for his recovery rather as a duty than from any expectation of their efficacy. He considered the operations of death upon his system as coeval with the disease; and several hours before his decease, after repeated efforts to be understood, succeeded in expressing a desire that he might be permitted to die without interruption.

During the short period of his illness he economized his time in the arrangement of such few concerns as required his attention, with the utmost serenity, and anticipated his approaching dissolution with every demonstration of that equanimity for which his whole life had been so uniformly and singularly conspicuous.

JAMES CRAIK,
Attending Physician.
ELISHA C. DICK,
Consulting Physician.

The signature of Dr. Gustavus Brown, of Port-Tobacco, who attended as consulting physician, on account of the remoteness of his residence from the place, has not been procured to the foregoing statement.

FOREIGN.

THE laſt number of the *Annales de Chymie* preſents us with an intereſting memoir on the combuſtion of the diamond, by GUITON (Morveau), which throws conſiderable light on its compoſition, and verifies the important experiments made by Lavoiſier and Tennant.—The diamonds employed in theſe experiments were taken on board an Engliſh ſhip coming from Senegal, and being in the rough, and not fit for the jeweller, a part of them was given to the Polytechnic School, by order of government, out of which were taken the two that were the ſubjects of theſe experiments. The combuſtion was performed in oxygen gas, by means of the ſolar light, and all proper attention was paid to the accuracy and purity of the gas employed. In the firſt experiment, the large lens belonging to the Polytechnic School was employed; and in the ſecond, that of Tſchirnhauſen. The circumſtances of combuſtion were the following:—The diamond at firſt became black, and of a coaly appearance; then, as the heat increaſed, the blackneſs was ſucceeded by luminous points, boiling up, as it were, through the blackened part, till it was beautifully tranſparent throughout, and with ſomewhat of a metallic luſtre, till the diamond was totally conſumed. If at any time the ſun's rays were intercepted, it appeared of a glorious red, but which ſoon went off; and it grew cold without being able ſpontaneouſly to continue the combuſtion, and, when cold, remained beautifully tranſparent. During the combuſtion (which was carried on at intervals for ſome days), the angles of the diamond were gradually rounded off, and melted down, as it were, till the octahedral form was no longer diſtinguiſhable; but it continued tranſparent to the laſt particle. The air remaining in the veſſels after the combuſtion, aſſayed by barytic lime-water, ſhewed a large production of carbonic acid, and (what is remarkable in this experiment) this acid, inſtead of being compoſed of 28 of carbon, and 72 of oxygen, as is the caſe with common charcoal, ſhewed a compoſition of 17.88 of diamond, and 82.12 of oxygen. From this important reſult it would appear, that the diamond is a carbonaceous ſubſtance, much richer in combuſtible matter than charcoal, as it requires a much greater quantity of oxygen for the production of an equal quantity of carbonic acid; for if the above numbers are re-

duced to unity, it will be found that one part of charcoal abſorbs in combuſtion 2.527 of oxygen, and produces 3.575 of acid: whereas, 1 part of diamond abſorbs 4. of oxygen, and gives 5. of acid. From the leaden colour which the diamond aſſumed in the courſe of combuſtion, the author ſuppoſes a partial converſion into plumbago, which is intermediate between the diamond and charcoal, as to the quantity of oxygen abſorbed in combuſtion, and the heat required for this proceſs. The carbonaceous mineral *anthracolite*, or *carburet of alumine*, reſembles plumbago in this reſpect. Therefore the author concludes, that diamond is the pure carbonaceous principle; and this, in a low degree of oxygenation, produces plumbago, anthracolite, and the different ſpecies of difficultly combuſtible coals; in a higher degree, common charcoal; and, in complete oxygenation, carbonic acid. Of theſe, the pureſt carbon is that which requires the higheſt heat for combuſtion; and, therefore, diamond and plumbago, even when fully ignited, cannot continue to burn when the igniting heat is removed. This difficulty of oxygenation reſembles that of azote, which, when pure, requires the electric ſpark, or ſome very powerful agent, to produce oxygenation; but when partly oxygenated, in the form of nitrous gas, requires only the mere contact of oxygen to produce a full ſaturation. [*Monthly Mag.* vol. viii. p. 732.

The Rev. Mr. Senger, of Reck, in Weſtphalia, has diſcovered a new ſubſtance for making paper. It is taken from the aquatic plant, called by Linnæus *conferva rivularis* (Eng. crow-ſilk), a vegetable very plentifully growing in all European rivers. The inventor having ſpent many years in making experiments, and perfecting his diſcovery, is now publiſhing a circumſtantial account of it; from which it appears that the above material furniſhes as excellent paper as that obtained from rags, and at leſs expenſe. [*Ibid.* p. 731.

The plague, a ſcourge in the train of ſlavery, which deſolates the frontiers of Turkey, but which may find too many opportunities of eloping from its boundaries, from the general movements wherewith Europe is at preſent agitated, ought to excite, more than ever, the attention of philoſophers and the vigilance of governments. What are the means of combating or of ſuppreſſing this ſcourge? Such is particularly the queſtion on which citizen Papon has been

occupied in a work, a ſketch of which he has offered to the claſs. In tracing the origin of the plague, the author obſerves, that Egypt was unacquainted with it in thoſe glorious and happy ages, when the borders of the Nile were rendered, by the arts and ſciences, the moſt fertile and populous country on the globe. It was in Europe, and eſpecially in Italy, that this ſcourge was then indigenous and endemial. It was ſeen to ravage the Roman territory five-and-twenty times during the firſt five ages of the republic; during the two following it became more rare in proportion as civilization improved; it appeared again under the laſt emperors; recommenced with them the ages of barbariſm, and devaſtated, a long time, the fineſt countries in Europe, till the epoch in which the arts reviving, extinguiſhed, a ſecond time, the germs of contagion, or baniſhed them to the coaſts of uncultivated Africa. [*Ibid.* p. 710.

Dr. Pearſon has lately publiſhed a paper, entitled, "A Statement of the Progreſs in the Practice of the Vaccine Inoculation, and Trials to determine ſome important Facts relating to the Vaccine Diſeaſe." From this communication we learn,

1. The proportion of deaths by the vaccine diſeaſe to be one in about 2000 already inoculated, and in the ſmall-pox the proportion is eſtimated at ten times this number of deaths, or one out of 200.

2. That no eruptions like the ſmall-pox have been ſeen by the author, or are ſtated in the accounts ſent to him during the laſt four months.

3. That although, in many caſes, the cow-pox by inoculation is a more ſevere diſeaſe, and attended with more alarming ſymptoms than was originally repreſented, yet, in general, it is a far ſlighter diſeaſe than the inoculated ſmall-pox.

4. That neither in his own practice, nor in that of his correſpondents, have any bad conſequences enſued from the inflamed arms, although, in ſome caſes, the eryſipelatous, or, as Dr. Pearſon calls it, *erythematous* affections were very formidable. In particular he ſtates, that the conſtitution was very little diſordered, when almoſt the whole arm was covered with erythema; and that this affection, without any applications, or merely ſedative ones, ſpeedily diſappeared.

Dr. Pearſon has the ſatisfaction of announcing, that the vaccine inoculation has occaſioned a conſiderable ſenſation in Germany, and that ſome of the principal phyſicians at Vi-

enna, viz. Dr. De Carro and Dr. Ferro, have already inoculated their own children with matter tranſmitted by himſelf; that Dr. Frank propoſes to ſubſtitute the cow-pox for the ſmall-pox in his inoculation practice.

Dr. Pearſon expects ſoon to receive accounts from Portugal. In Scotland nearly one hundred perſons have been inoculated by Dr. Anderſon; and Dr. Pearſon finds that the practice is extending rapidly in that country.

But the moſt curious part of this paper is that concerning his *trials* to obtain ſome uſeful determinations reſulting from experience.

1. It is known that the ſmall-pox renders the conſtitution unſuſceptible of this diſeaſe a ſecond time.

2. It ſeems now proved, that the cow-pox renders the conſtitution unſuſceptible of the ſmall-pox.

3. Dr. Pearſon ſhews, by experiments, that perſons who have had the *ſmall-pox* cannot take the cow-pox, contrary to Drs. Jenner and Woodville.

4. It might hence be concluded, that a perſon who has undergone the cow-pox is unſuſcepible of the cow-pox a ſecond time; but although the preceding propoſitions ſeem to demonſtrate this laſt fact, Dr. Pearſon does not truſt to reaſoning, but determines it by obſervations. [*Med. & Phyſ. Journal.*

In the ſeventh number of the "Medical and Phyſical Journal," we find the following communication from Mr. Thomas Henry, of Mancheſter.

The uſe of digitalis purpurea, in pulmonary diſeaſes, has, for ſome years paſt, been no novelty in this town; and the gentlemen who have employed it, have commonly joined it with opium—a combination by which the inconveniences of the two medicines, often experienced when they are given ſeparately, are happily corrected. Perhaps the Materia Medica contains no remedy which affords more relief to, and which even cures, harraſſing coughs, attended with inflammatory ſymptoms, that often induce phthiſis, than the digitalis; though I cannot ſay I have ever known phthiſis, when really formed, to be removed by it.—From its remarkable effects in diminiſhing the force of the arterial ſyſtem, Dr. Ferriar was led to adminiſter it, with great ſucceſs, in caſes of active hæmorrhage, and, by parity of reaſoning, I laſt winter employed it with advantage, in a caſe of acute rheumatiſm.

A gentleman's ſervant, of thin habit, and narrow cheſt, by careleſſly expoſing himſelf to the cold of laſt winter, was repeatedly attacked by a bad cough, which yielded to the common remedies.—On the firſt of December, by inattention to thoſe precautions of warm clothing, &c. which had been recommended to him, his cough returned, attended with acute pain in his breaſt, affecting his reſpiration ſo as to threaten peripneumony: blood, which proved ſizy, was taken from his arm; antimonials, demulcents with nitre, and aperients, were exhibited: the pain now quitted his breaſt, and attacked his ſhoulder, from whence, during the enſuing days, it removed alternately from the higher and lower limbs, attended with ſuch ſwelling of the hands and feet as clearly pointed out the caſe to be rheumatic. In addition to the above-mentioned medicines, he, on the evening of the fourth, took pulv. ipecac. c. ſcrup. j. which was repeated every night till the eighth, when, the pain increaſing in violence, the antimonials were omitted, and ten grains of the ſame powder were given every ſix hours. The remedies that had been uſed cauſed profuſe perſpiration, but without producing the leaſt abatement of his pain, and his pulſe beat 140 ſtrokes in the minute. My experience had taught me not to expect much relief from repeated bleeding in this diſeaſe, yet it ſeemed neceſſary to reduce the action of the veſſels. From the well-known efficacy of digitalis in diminiſhing the frequency of the pulſe, it occurred to me, to make trial of it on this occaſion; and the cough being very troubleſome, and pain acute, I determined to join opium with it: accordingly, at three o'clock in the afternoon, December 9th, he took a pill compoſed of opii gr. j. pulv. fol. digital. purpur. gr. ſs. On viſiting him in the evening, his pulſe was found conſiderably leſs frequent, and he thought his pain and cough not quite ſo ſevere. He was directed to repeat the pill every eight hours. The next morning all his ſymptoms were ameliorated, and his pulſe reduced to about 90. The ſame plan was therefore continued, with evident advantage, attention being paid to avoid conſtipation, till the fourteenth, when the rheumatiſm being removed, and his pulſe reduced nearly to the natural ſtandard, the digitalis was omitted, and he was ordered a decoction of bark, with antimonial wine; but his cough being at times troubleſome, he took a pill of opium and camphor twice a day, for two or three days longer. On the 18th, the cough being ſtill teazing, a bliſter was applied between the ſhoulders; and, by it, and

a continuance of the bark for a few more days, he was completely cured.

It is with pleasure I am able to bear testimony of the good effects of opiate friction, as recommended by my worthy friend, Mr. Ward, in the fifth number of your Journal.

A young lady of about thirteen years of age, much harrassed with ascarides, had been removed, on the death of a brother by typhus, from this town to Warrington. In a few days symptoms of typhus attacked her; but instead of proper measures being taken, she was encouraged to walk out; and, growing worse, her friend, with whom she had been placed, brought her, on the tenth day of the fever, twenty miles in a stage-coach, to her parents. On the evening of this day, July 28th, I visited her, and found her in a state of great irritability, with a rapid pulse, considerable heat, and fallen countenance: her bowels being constipated, she was, with great difficulty, prevailed on to take a powder consisting of calomel and James' powder, of each one grain, rhubarb and opiate powder, of each four grains. This procured three loose stools, in which a great number of ascarides were discharged: she now, with a degree of obstinacy I have seldom witnessed, protested against taking any medicine, or even any appropriate food. On the thirteenth, a diarrhœa prevailing to an alarming degree, ten drops of laudanum, concealed in a cup of coffee, were given without her knowledge; and this single dose was the only medicine which, during three days, we were able to administer. She was sinking fast, her pulse very rapid and feeble, and she had a tendency to delirium. Wine, which in this state seemed highly requisite, she positively rejected; and I despaired of being able to succeed by internal means. I therefore resolved to try the external application of opium. The following ointment was directed to be divided into two parts, and one of them to be rubbed into the thigh of the patient, by an assistant, whose hand was ordered to be covered with a soft bladder:

℞. Opii subtilissime pulv. scrup. i.
Adipis suill. drachm iij.
Camphor. scrup. ss. M. and divide in chartulas duas.

This application seemed to have some sedative effect, and was, therefore, repeated in the evening. The next morning, August 1st, I had the satisfaction to find that she had had some comfortable sleep; but the looseness recurring, we contrived to convey ten drops of laudanum again in coffee. The oint-

ment, with an increaſe of ten grains of opium, was continued; and, as ſhe appeared more compoſed, I determined to abide ſteadily by it. The good effects were each time more evident; ſleep almoſt conſtantly followed the application of the ointment, though no more laudanum was given internally; her pulſe and the intenſity of heat were gradually reduced, the diarrhœa was ſtopped, and, on the fourth day from the commencement of this treatment, ſhe began to take ſome wine, acidulated with ſulphuric acid. The friction on different parts was perſiſted in till the 8th of Auguſt, incluſively; when the urine having, for the two laſt days, depoſited a proper ſediment, and every ſymptom of fever having diſappeared, it was diſcontinued. [*Ibid.*

Case of Paralysis cured by the Inhalation of Vital Air.

Mr. Huitſon, who diſſects for Mr. Cruickſhank and Mr. Wilſon, eminent teachers in the ſchool of the late Dr. Hunter, had a paralytic affection of the right hand, which deprived him of its motion, and it felt to the other hand always remarkably cold. The paralyſis ſeemed chiefly ſeated in the muſcle of the thumb. I adviſed him the trial of electricity; and we obſerved, as well as thoſe who accompanied him, that the electric ſpark did not fly with a crackling noiſe to the paralytic muſcles. Trying a piece of dead meat, we found the ſame phenomenon. We then had recourſe to inhalation of vital air mixed with atmoſpheric, and he inhaled from ſix to eight quarts of vital air. The muſcle, now receiving oxygenated blood, afterwards caught the electric ſpark very readily, and a genial warmth was diffuſed throughout the paralytic hand. This was not a ſolitary obſervation, but conſtant; and it ſeems to me very forcibly to prove the animating principle derived from the oxygen of the air to the muſcular fibre; a principle not, as repreſented by Mayow, the moſt ſubtle, ſpiritual, and ætherial, but one that can be made obvious to our ſenſes in the form of air, adhering to the calces of metals, and capable now of being conceived even by the moſt groſs underſtandings.

The patient, I am happy to add, by this *combination* of external and internal ſtimulants, was completely reſtored, and has continued many months perfectly well. [*Philoſ. Mag.*

Dr. Carradori, in his fifteenth volume of the "*Annali di Chimica*," gives a deſcription of a very convenient apparatus for impregnating liquids with the carbonic acid; and we have only to regret that he has not furniſhed us with a more perfect and ſatisfactory account. This apparatus conſiſts of a caſk, bound with iron hoops, and large enough to contain about four pailfuls: no more than two thirds of that veſſel ſhould be filled, and a communication eſtabliſhed between it and a glaſs bottle, which contains powdered marble and ſulphuric acid. An aperture ſhould be made in the upper end of the caſk, into which a curved tube is introduced, to carry off the ſuperabundant gas. The author aſſures us, that with this apparatus a perſon may, in leſs than half an hour, ſaturate any quantity of water in proportion to the carbonic acid diſengaged.

Van Mons, who has extracted this article from the aforementioned work of Brugnatelli, obſerves, on this occaſion, that ſeveral other methods have been lately propoſed for the ſaturation of water with alkalies and the carbonic acid; but that an eſſential improvement might be made on the apparatus propoſed by the indefatigable chemiſt of Pavia, namely, by conveying the decompoſing acid on the carbonate of lime, by a ſlow inſtillation, which might be effected by paſſing the communicating tube tranſverſely over a funnel adjuſted to the mouth of the receiver. By this contrivance, a regular and gradual diſengagement of the gas will take place, none of it will be loſt, and the acceſs of atmoſpheric air prevented; which, by mixing with the gas diſengaged, neceſſarily retards the ſaturation.

It is worthy of remark, that the difficulty of procuring, in Italy, glaſs veſſels provided with more than one neck, firſt induced the author to adopt the apparatus here deſcribed. The ſaturation may be greatly facilitated by employing a ſimple gaſometer in conducting this proceſs.

[*Med. & Phyſ. Journal.*

Mr. William Higgins, of Dublin, has brought into uſe an important improvement in the proceſs of bleaching. In the ordinary proceſs, the cloth is repeatedly boiled in an alkaline ley previous to expoſure to the ſun and air, and the expenſe of the alkali is a very conſiderable object to the manufacturer. Mr. Higgins has ſubſtituted a ſolution of ſulphuret of lime, made by boiling together ſulphur and quick-lime, with a large

quantity of water; and the great cleanſing powers of this liquor render it equal to the alkaline ſolution, with a great ſaving both in the expenſe of the materials and in fuel, as the ſulphuret will anſwer equally well in the cold. Mr. Higgins eſtimates the quantity of alkali uſed at preſent in bleaching to coſt £215,307, being both pearl-aſh and barilla, and an equal quantity of ſulphuret of lime in ſolution to be prepared at ſomewhat leſs than half this expenſe, with the additional advantage of ſaving great part of the fuel, and poſſeſſing both the lime and ſulphur at home, and, therefore, ſaving the importation of all the alkali. [*Monthly Mag.* vol. viii. p. 733.

Cit. Van Mons communicates the following obſervations relative to the preparation of the black oxyds of antimony and mercury *(æthiops antimonialis)* in the humid way.

Antimony, by its combination with ſulphur, or crude antimony, very forcibly retains this combuſtible ingredient, though it be not ſufficiently ſaturated to part with it by ſimple trituration with mercury. The extinction of this metal, which was ſuppoſed to take place in the ſulphur, was, after an extremely tedious experiment, ſo far from being accompliſhed, that the reſult appeared to be a mixture conſiſting of the ſulphur of antimony and black oxyd of mercury united by air. Quarin endeavoured to remedy this defective operation, by adding ſulphur to the matter ſubjected to trituration; but this improvement tended only to abridge the labour, and afforded a ſtill more imperfect mixture of the two ſulphurs of antimony and mercury.

Van Mons propoſes to prepare the antimonial æthiops by precipitating the hydro-ſulphureous alkali of the antimony with the nitrat of mercury. To compoſe this hydro-ſulphur, twelve parts of the ſulphur of crude antimony are boiled with ſix parts of cauſtic potaſs and three parts of ſulphur, in a ſufficient quantity of water. In theſe proportions of the ingredients, the ſulphur which is formed does not occaſion any precipitate on cooling. A portion of the liquid is filtered, and examined whether the alkali is ſaturated with the antimonial ſulphur. This point being aſcertained, the liquor ſhould be precipitated in a very clear and gradual manner, by means of a ſolution of mercury in the nitric acid.

No hydrogenated ſulphureous gas is diſengaged during the precipitation, as the hydrogen is converted into water by the

portion of oxygen which the mercury ought to diſcharge, in order to become a black oxyd, this being the only degree of oxydation in which it can unite with the ſulphuric baſe to form ſulphur.

The precipitate, when waſhed and dried, is black, lightly tinged with green. It might be admitted into pharmacy, under the denomination of *æthiops antimonial, in the humid way.* The phyſicians of theſe departments who have preſcribed it, have aſſured the author, that its exhibition has been attended with the beſt effects. [*Annales de Chimie*, No. 89.

The ſame author has, in a letter to Kaſteleyn, on the *non-oxygenability of the ſulphuric acid*, added the following facts, in addition to thoſe ſtated by Vauquelin and Bouvier.

1. Twenty grains of the filings of zinc, diſſolved in four ounces of ſulphuric acid, were diſtilled over the oxyd of manganeſe, and ſufficiently diluted. During the ſolution hydrogenous gas was diſengaged. If the acid had been oxygenated, it would have imparted to the zinc its oxygen, ſome of which it required to diſſolve it, and the water would not have been decompoſed.

2. The ſame experiment, made with iron inſtead of zinc, afforded a ſimilar reſult.

3. Thirty grains of zinc, diſſolved in three ounces of ſulphuric acid, were digeſted over the oxyd of manganeſe, according to the inſtructions of Giobert. The ſolution, in this inſtance, took place without any diſengagement of hydrogen gas; but the metal diſpelled the oxygen from the oxyd of the diſſolved manganeſe, and not from the ſuppoſed oxygenated acid; it being proved by the diſappearance of the red roſe colour, that the ſulphuric acid owed its combination with a portion of the oxyd of manganeſe, to the maximum of oxydation.

4. The ſame experiment, made with iron, produced a ſimilar effect.

5. The nitric acid, boiled with the ſulphuric acid, did not oxygenate the latter.

From theſe experiments, Van Mons has diſcovered how to prepare a liquor for artificial bleaching, which is remarkably cheap, and eaſily procured. Three parts of muriatic acid muſt be digeſted over one part of the oxyd of manganeſe, in a glaſs retort cloſely ſtopped; after a ſufficient digeſtion, the limpid part is poured off, and precipitated with potaſs or ſoda,

in order to ſeparate that portion of the oxyd of manganeſe which is diſſolved; the ley is then filtered, and the precipitated oxyd is added to that which is not diſſolved, to waſh and make them re-oxyde in the open air, by the medium of water. In this manner the ſame oxyd may continually ſerve for new operations, and contribute much to the cheapneſs of the proceſs.

This oxygenated liquid always retains a purple colour, if it be not ſurcharged with alkali; and it greatly reſembles faggot-ley. *(leſſive de javelle).* [*Ibid.*

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M. Hildebrandt has lately made ſome uſeful experiments *on the ſolution of mercury in the nitric acid*, of which the following is an abſtract.

One hundred parts of concentrated nitric acid diſſolved one hundred and twenty-five parts of mercury. The ſame acid, diluted with half its quantity of water, diſſolved one hundred and ninety-ſeven parts of the metal; but, when diluted with equal parts of water, it did not diſſolve more than one hundred and ſeventy; and, if mixed with double its quantity of water, its ſolvent power was reduced to one hundred and fifty parts.

The cryſtalline form of the nitrat of mercury varies according to the circumſtances in which the ſolution is made, whether in a low or high temperature, or if the acid is in a concentrated or weak ſtate.

The nitrat of mercury uniformly depoſits a portion of the white oxyd of that metal by its ſolution in water.

The nitrous ſolution of mercury forms cryſtals the moment it parts with its free or unſaturated acid.

The mercurial oxyds diſſolve in a ſmaller quantity of the nitric acid than mercury in the metallic ſtate.

The mercury is precipitated from its nitrous ſolution by the alkalies and cauſtic earths, in colours which differ according to the manner in which the ſolution has been made, or according to the ſtate of oxydation in which it was diſſolved.

Mercury and its different combinations offer a vaſt field to the inquiries and reflections of the chemiſt. M. Hildebrandt has diſcovered, by his experimental operations on this metal, at leaſt *three hundred new facts*, and yet remarks that he has ſcarcely begun its inveſtigation. [*Ibid.*

Van Mons has accidentally diſcovered a method of producing *a real white oxyd of mercury*, by precipitating the oxygenated muriat of mercury, formed by the mixture of the red oxyd of mercury, diſſolved in the nitric acid by heat, with a ſolution of the muriat of ſoda. The precipitates which were formed by the firſt additions of alkali, diſappeared almoſt as ſoon as they were ſeparated; yet they were every time produced in great abundance. When the whole of the acid was ſaturated with ammonia, the precipitate became fixed; and its colour was of the fineſt white, and extremely light.

Neither the cauſtic, fixed, and volatile alkalies, nor lime, affected the colour of this precipitate; which only volatilized to a red colour, while it was reduced; it readily diſſolved in the nitric and muriatic acids, &c. In ſhort, it appeared to be a real oxyd of mercury, from the relation in which it ſtands to the alkalies and lime. [*Ibid.*